THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. IX. No. 199—12th YEAR.] LONDON, JUNE 5, 1860. [Subscription { 15s. in Advance / 18s Credit } DOUBLE No. Price 1s.

TO GAS COMPANIES.

FIRE-CLAY Retorts and Fire Goods.

The Advertiser has brought his Fire-Clay Retorts to great perfection, both as to quality and finish. Many have stood three and four years.

Every description of Fire Goods in any quantity always on hand. The Fire Clay is the very best in the North of England. Stock never less than 10,000 tons weathering.

Orders promptly executed.

Apply, G. H. RAMSAY, of Derwenthaugh Fire-Brick Works, near NEWCASTLE-ON-TYNE.

Aug. 22, 1856.

TO IRONFOUNDERS AND OTHERS.

THE Directors of the Tunbridge Wells GAS COMPANY will be prepared, on Wednesday, June 13, to receive Tenders, at per Ton, for the supply of about 30 best Cold-Blast Iron RETORTS, to be delivered free at the Bricklayers' Arms Station of the South Eastern Railway, as required, within three months from that date; the description of Iron to be stated in the Tender.

Tenders to be sent to the office, TUNBRIDGE WELLS, by six o'clock, P.M., on Wednesday, June 13 (marked Tenders for Retorts), addressed to the SECRETARY, of whom any further particulars may be ascertained.

The lowest or any Tender will not necessarily be accepted. By order, JOHN READ, Secretary.

Tunbridge Wells, June 1, 1860.

NOTICE TO ENGINEERS.

GLASS PIPES for Gas and Water-WORKS.

Public opinion has been somewhat prejudiced against the real advantages of employing glass pipes for gas and water-works. It is natural that such a prejudice should exist, on account of the liability of glass to be broken when struck suddenly by a hard substance. But this liability to breakage disappears when glass tubes have only to resist a regular pressure. For this reason, scientific men have thought that glass pipes would be well-adapted for gas and water-works; but it has been found difficult to join the tubes securely, and prevent leakage. Mons. PIERRE REGOUT, of Maestricht, Netherlands, has proved, however, by an experience of 14 years, and over a length of 6000 mètres, that glass pipes are perfectly serviceable, and that these objections no longer exist. The pipes in question having been recently taken up, for private reasons, they were found to have suffered no injury whatever. It would occupy too much space to give here a detailed account of their use, but Mons. Regout, being the manufacturer of the same, will feel much pleasure in giving information to any inquirers. Considering the aforesaid advantages, they are much cheaper than iron pipes.

Mons. Regout has a stock now ready of about 10,000 mètres, of from 2 to 4 inches internal diameter, which he can deliver at London, freight included, at the price of 30s. per cwt.

Glass and glasswares can now be imported into England entirely free of duty.

BELGIAN CLAY RETORTS.

ALBERT KELLER Ghent.—The removal of the import ies on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications, addressed to ALBERT KELLER, GHENT, will receive immediate attention.

WANTED, a Situation in a Gas-WORK, as FOREMAN or MANAGER, by one who is well acquainted with the manufacture of Gas, to work Clay Retorts, good Accountant, &c.; good Testimonials.

Address, J. W., Railway Hotel, Luton, BEDS.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.

Coal and Coke Office,

QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,

THE OLD TUBE WORKS,

CHURCH HILL, WEDNESBURY;

ALMA WORKS,

WALSALL, STAFFORDSHIRE;

and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

COUNTY CHAMBERS,

CORNHILL, LONDON, E.C.

MR. R. P. SPICE, of Richmond, respectfully announces that, for greater convenience, he has removed the business of his Office to the above address.

Plans, Specifications, and Estimates, prepared for the Erection or Improvement of Gas-Works.

Agent for the Purchase, Sale, or Leasing of Provincial Gas-Works.

The Green, Richmond, S.W., Jan. 2, 1860.

THE TOWN OF BURTON-UPON-TRENT ACT, 1853.

WANTED, a Gas Manager.—In consequence of the serious illness of the Manager of the Gas-Works at Burton-upon-Trent, the Commissioners require a duly qualified person to undertake the MANAGEMENT of the said Works.

The duties of the situation, salary, and other particulars, may be known on application to me.

Applications, in the handwriting of the candidates, stating age, accompanied by recent Testimonials of character and ability, endorsed, "Application for the Office of Gas Manager", to be forwarded to me on or before 12 o'clock at noon, on Tuesday, the 12th day of June next. By order,

WILLIAM COXON, Clerk to

the Burton-on-Trent Town Commissioners.

Commissioners' Offices, Burton-on-Trent,

May 28, 1860.

MR. SHEEN, Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:

JAMES LAWRIE & CO.,

63, OLD BROAD STREET, CITY, LONDON.

TO CONTRACTORS.

THE Galway Gaslight Company will receive Tenders up to the 11th June prox., for the erection of a TANK and GASHOLDER. The Tank, when finished, to be 41 feet 6 inches inside diameter by 16 feet deep; the Gasholder to be 40 feet in diameter and 16 feet deep.

Parties tendering may send Specifications with their proposals, and can tender for either or both of these Works.

Any further information required can be obtained by application to the undersigned.

L. S. MANGAN, Secretary.

Galway, May 30, 1860.

TO GAS COMPANIES.

WANTED, by the Advertiser, a SITUATION as MANAGER of Gas-Works. Is 32 years of age, and married. Has had the Management of Gas-Works for seven years; the last three years in works making nearly 40,000,000. Understands setting Clay Retorts on approved plans, purifying by Oxide of Iron, and manufacture of Sulphate of ammonia; and is quite conversant with all matters connected with the distribution of Gas, including estimating for internal Fittings. Has also had experience in an efficient system of keeping Gas Books and Returns.

Can produce first-class Testimonials.

Address, A. B. C., care of Mr. W. B. KING, 11, Bolt Court, Fleet Street, LONDON.

TO GAS COMPANIES.

WANTED, a Situation as Inspector or FOREMAN of the Meter Department in a Gas-Works. Will undertake the alteration or repairing of any description of Meters to meet the requirements of the new Act.

For references or other particulars, address A. Z., care of Mr. PRICE, Post Office, Tintern, near Chepstow.

TENDERS FOR TAR.

THE Directors of the Bath Gaslight and COKE COMPANY are desirous of receiving Tenders for the TAR which shall be produced at their Works, for One, Two, or Three Years, commencing from the 22nd June next.

Tenders will be received up to Tuesday the 12th of June.

About 600 Tons will be produced in the first year.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,

Old Barge Iron Wharf, Upper Ground Street,

LONDON.

LORD REDESDALE'S ACT.

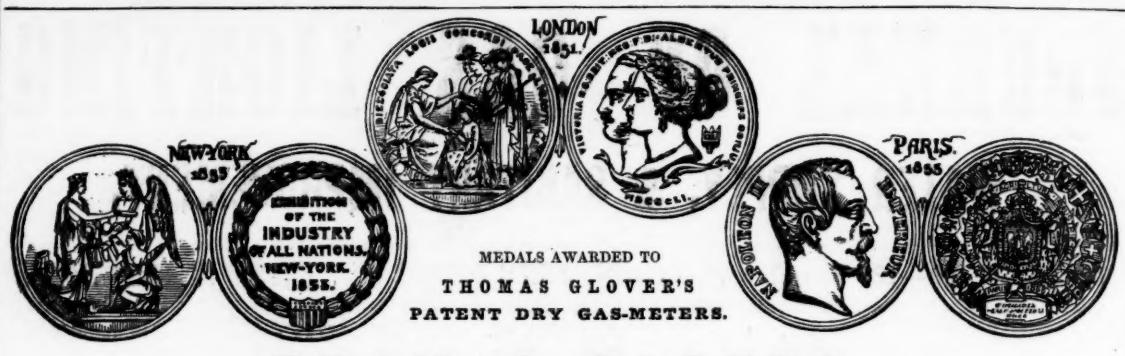
GAS-METERS.

D. HULETT & CO.

Have always made their Meters with the Low Spouts; consequently no alteration is required.

55 and 56, HIGH HOLBORN, LONDON.

JOURNAL GAS LIGHTING ONE PENNY NEWSPAPER



MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

THOMAS GLOVER,

PATENT DRY GAS-METER MANUFACTURER,

SUFFOLK STREET, CLERKENWELL GREEN, AND
ALLEN STREET, GOSWELL STREET, E.C.
Established 1844.

LORD REDESDALE'S "SALE OF GAS BILL."

LONDON, August 15, 1859.

THOMAS GLOVER takes the earliest opportunity of intimating to Gas Companies and his other Customers that, as Lord Redesdale's "Sale of Gas Bill" has determined the unit of measurement, he is now prepared to supply his Patent Dry Gas-Meters guaranteed to meet all the legal requirements of that bill.

THOMAS GLOVER confines his sole attention to the business of Gas-Meter Making. The propriety of his doing so is satisfactorily proved by his success; and, without the practice of any quackery, or any attempt to delude the public by an absurd exhibition of "Old and New Valves," his Meters are in general use by the Metropolitan Gas and other Companies in this Country and abroad. For example, one Metropolitan Company have now in use above **12,500** of his Patent Dry Gas-Meters; some of these Meters have been fixed for Fourteen Years, and are still in working order, without complaint from either the Company or the Consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other Country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may at any time inspect his Works and the Materials of which his Meters are constructed. He is ready to enter into Contracts with Gas Companies and others to uphold their Stock of his Meters for Twenty Years at an annual charge varying from 2½ to 5 per cent., and to leave always in the hands of Gas Companies Three Years' charge for upholding, as a guarantee for the fulfilment of the Contract.

CROSLEY & CO.

ARE PREPARED TO SUPPLY GAS COMPANIES AND OTHERS WITH

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

Similar to that Manufactured by them, and verified by

The ASTRONOMER ROYAL, and Professor MILLER, of Cambridge,

ON BEHALF OF THE GOVERNMENT,

Which was deposited by C. and Co. in the Office of the
COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, in compliance with the

"ACT FOR REGULATING MEASURES USED IN SALES OF GAS."

THEY ALSO SUPPLY

TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

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NOTICES.

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All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 5, 1860.

NOTES UPON PASSING EVENTS.

THE *Times* is becoming facetious about the imminent "massacre of the Innocents," and it already commences its elegies upon the premature extinction of so many schemes for the benefit of humanity which we have been accustomed to witness at this period of the Session, since the introduction of the modern system of empirical legislation. It is singular, however, and the more singular when we reflect upon the past history of that Journal, that the *Times* makes no allusion to the manifest anxiety of the Government to avoid anything like a discussion of the important question of the renewal of the Poor Law Board, and that our contemporary blindly turns from the consideration of a subject which once filled so large a portion of its columns. Is this done to show the independence of that Journal from Mr. Walter's influence, or is it done to avoid disturbing the repose of the bureaucrats who now fill the well-paid places of the Poor Law Board? Surely the subject itself is of sufficient importance to require investigation of the most serious description; and the public is entitled to call for it in time for its consideration before any renewal of the present system is decided upon. It seems, at present, that we must either submit to the usual Whig tactics of continuance bills in this case, as in so many others of late; or that hasty and ill-considered legislation will take place. Will not the members of the Legislature who are connected with the Gas, Water, and Railway Interests, at least, call upon the Government to state its intentions on a subject to them of such moment? The burthen of the Poor Rates upon such concerns is surely great enough to justify their intervention. Such measures as Mr. Paul's Piers and Harbours' Act may be quietly inurned without observation; but it is a very different matter when the maintenance of our Poor, and the mode of collecting the funds for that purpose are in question. There may be doubts as to the "innocence" of either of the measures, yet still it may admit equally of doubt whether they should be confounded in any general massacre.

A few weeks ago, there was a vigorous exhibition of virtuous indignation by members of the House of Commons on the subject of the rotten gun-boats; but the prize-fight, the Derby, and the holidays have quite put this disgraceful story out of men's memories. This is a very unfortunate matter, because every new fact which has been elicited with respect to these boats only serves to illustrate the carelessness, if no other word be used, and the want of practical knowledge, which prevail in the higher walks of our Administration. It seems that Lord C. Paget admitted that elm planks had been tolerated in the construction of these vessels; and then, to make the matter worse, the boats after having been for a few months in the water, that is to say sufficiently long to allow the timber to become saturated, were hauled up the slips at Portsmouth. As a necessary consequence, elm so treated would decay; but it was also to have been expected that the unseasoned timber, used with the knowledge and sanction of the Admiralty, must have decayed when the boats were hauled up on the slips, without the observance of any precautions for ensuring a circulation of air through their timbers. Mr. Green's defence against the accusation with respect to the short copper bolts seems to us to have been singularly injudicious in the present state of proceedings; still knowing what we do with respect to the requirements of public administrations, we hesitate before we draw any absolute conclusions with respect to the conduct of this firm. The story recorded in the *Times* of the 28th of May, of the state of the timbers of the *Trusty*, seems also to show that there may be in all these vessels conditions of decay not yet ascertained; and we ourselves believe that some reaction takes place between the oak and the iron plates of the cased vessels which may seriously affect their value as durable implements of war. In fact, all our knowledge with respect to the questions connected with the decay of unprepared timber in sea water is in a very unsatisfactory state; and it were much to be desired that some careful examinations were made upon this particular branch of science. We may add that our own theoretical opinions as to the incorrectness of the generally received reputation of the Greenheart timber, on account of its supposed immunity from attack by the marine boring worms, have been strikingly confirmed by our receiving from Victor Bay, Panama, a portion of a pile of that wood, which had been regularly riddled by the teredo navalis. What will the Liverpool people say to this?

Whilst upon this subject of marine architecture, it may not be out of place to call attention to the fact that very recently the *Crécy*, a vessel of 91 guns, could not be brought up the Medway to Chatham; and that the river is gradually, but surely, shoaling up in the lower parts of its course. There can be little reason for surprise at this result, from the apathy of the parties charged with the conservancy of our navigable rivers; but, in the case of the Medway, this apathy has been, if possible, carried to an exaggerated extent; and it must be a matter for serious reflection thus to observe that the highway between two of our most important naval arsenals is allowed to become impassable. Towards the mouth of the Medway, that is, between Sheerness and Chatham, there are numerous islands and sub-channels, amongst which the scouring action of the ebb tide is allowed to diffuse itself, whilst the flood tide, in consequence of the peculiar laws affecting that class of phenomena on this coast, brings a remarkably large proportion of alluvial matters into the still waters of the embouchure. If proper attention had been paid to the lower parts of the Medway, the removal of the old Rochester Bridge ought to have led to an improvement in the state of the navigation; that it has not done so simply proves that there must be either gross ignorance, or gross neglect, on the part of those who are charged with the duty of keeping the Medway in an efficient state for war, or for navigation purposes.

We observe, however, that if our authorities neglect their duties in the cases of the proper superintendence of the construction of the Gunboats, and of the maintenance of the navigable channel of the Medway, they can be, and are, remarkably active when there is any possibility of their impeding the operations of private industry—so true is it that any Government is a necessary evil, and that its powers should be strictly and narrowly limited. It seems that the inspectors, appointed and paid out of the fines levied under the provisions of

the Smoke Nuisance Abatement Act—that special title of Lord Palmerston to the gratitude of the manufacturing interests of the metropolis—have recently instituted a series of persecutions against the steam tugs, the paper makers, and other small manufacturers, whilst they leave unnoticed the "dense volumes of opaque smoke" issuing from the wealthy Sugar Bakers' chimneys, or from those of the Baths and Washhouses. We always suspected, and we have now tolerably good reason for asserting that this Smoke Act is being converted into an instrument of extortion from manufacturers; but it has furnished the means of providing a few good places for some hangers-on of the Government, and of securing a little groundling popularity; so it would be in vain to expect that the defects of the present Act should be reformed, or that the powers that Act creates should not be used, commercially. It may be, as Lord Redesdale said to his Peers on a recent occasion (when moving the second reading of that most exquisitely absurd measure, "The Adulteration of Foods and Drinks' Bill" as it is called), "*that it is necessary to risk a little*, if they were to expect to do any good at all by legislation;" but we suspect that such a *hazardous* system of law-making is not one which Englishmen are likely to tolerate for any lengthened period, and certainly it is one which must be considered disgraceful to a body of men who pretend to guide the intellect of their generation. It would be curious to ascertain the sentiments of Messrs. Hassell and Co. on hearing the arguments of their patron, Lord Redesdale. How their ears must have tingled!

At the last meeting of the Hadleigh Farmers' Club, one of the guests, a Mr. Gurdon, a remarkably shrewd, practical man, made some observations, which may be recommended to the notice of our medical theorists on the subject of new forms of disease. Mr. Gurdon stated, that having made some careful observations on his own cattle affected by pleuro-pneumonia, he had arrived at the conclusion that the disease began to exhibit itself by an irritation of the bronchial organs, which, if taken in time, could be easily subdued, but which, if left unnoticed, was sure to turn to the more fatal disease of pleuro-pneumonia. Apart from the direct value of this observation with respect to the disease specifically referred to, it seems to us to convey another lesson—viz., that it is at all times dangerous to attempt to dogmatize upon any given phenomena, without having studied the various "conditions precedent." For our own parts, we believe that the scientific history of the Asiatic Cholera in some respects resembles that of the pleuro-pneumonia; or, in other words, that hitherto our medical authorities have directed all their attention to the final symptoms, instead of doing as Mr. Gurdon very sensibly recommends them to do, viz., direct their attention to the pathology and the mode of treatment of the premonitory symptoms.

A great deal of painful attention has lately been called to a subject we had ere now brought before our readers, namely, the explosions which so often take place in coal-laden ships, in consequence of some serious accidents of that description at Cardiff and Southamptom. We would now observe that there really seems to be far more danger from this source, in the case of the Welch, than in that of the north country coal; and, as the Welch coals are precisely those which are in the greatest demand for steam navigation, it follows that the persons connected with the shipping interest have a very cogent reason for instituting an inquiry into the subject of the precautions to be taken to prevent these fearful catastrophes. Some gentlemen have suggested the use of a pyrometer in the hold of coal-laden ships, in order thus to be able to watch the first symptoms of the evolutions of heat; and, no doubt, such a system might enable a careful observer to guard against a threatened case of spontaneous combustion. But, unfortunately, the class of men who command colliers are not careful observers; and, moreover, the evolution of explosive gases takes place at temperatures below those which are indicated by any generally known pyrometers. An efficient system of ventilation in the hold of the ships seems, indeed, to us to be the only real protection in these cases; and it is towards the discovery of some easy method of effecting this object that the attention of shipowners should be directed. One of the writers in the daily papers on the subject has suggested, in the usual style of the present day, that Government Inspectors should be named to enforce the observance of the necessary precautions for ventilating coal-ships. It is, however, much more likely that the evil complained of would be remedied by the simple refusal of Lloyd's to insure such vessels, unless they had been loaded according to some regulations prescribed by the Underwriters, and unless they had been examined by the Surveyors of that body. The laxity with which insurances are now effected is a virtual premium for carelessness and ignorance.

And whilst thus speaking of accidents, we cannot refrain from saying that we consider the punishment inflicted upon the drunken guard, who caused the painful one which took place on Wednesday, the 30th of May, as being totally inadequate to the object all punishment is intended to effect, viz., the prevention of a repetition of the offence. It is absurd to say that the fear of two months' imprisonment, even with hard labour, would deter the class of men employed as Railway guards from getting drunk whilst upon duty. Indeed, we are convinced that until the Managing Directors, Secretaries, or the whole Board of Direction of a Railway, are made personally responsible for the accidents which may occur on their lines, the public will be exposed to such misfortunes. In the very early days of the working of the Paris and Rouen Railway, an accident happened, wherein several people were injured; and in this case not only was the Company made to compensate the sufferers, but the Station-master of the place where the accident occurred, the porters, the engine-driver, and the stoker, and even the Managing Director himself, were all imprisoned and fined. The consequence was, that so long as that Managing Director remained in office, a space we believe of twelve years, no other accident occurred to the public on the Paris and Rouen Railway. That we should do well to adopt some such legislation in England seems also to us confirmed by a singular fact we ourselves witnessed a few weeks since. For, whilst walking by the side of one of the midland Railways, we actually picked up three keys, out of their chairs, on one line of rails, in the space of less than a quarter of a mile!

Some remarkable stories have been lately brought before the public, to which it may be worth while here to revert. The first is the conflagration of a Fen, near Spalding, in Lincolnshire; an event which seems, from the occurrence of the name of Burnt fen in some districts, to have been by no means rare in former days, but which we are startled to find renewed in these times of high farming. The second is the occurrence of an inundation in Lower Egypt, whereby the Cairo and Suez Railway was seriously injured; and the interest connected with this event lies in the strange evidence it would appear to afford of some gradual change in the climatological conditions of that particular country. It used to be believed that it never rained near Cairo; but evidently there must be exceptions to this rule. The third story alluded to is the one connected with the existing state of activity of the subterranean causes of disturbance of the earth's crust; for shocks of earthquake have been felt at the Mauritius, Nice, St. Domingo, and Callao, within a very short period of one another. If Dr. Parkyn's theories upon the origin of the cholera be correct, this telluric activity, so to speak, ought to develope some new form of disease; and on that score, as well as on the score of the singularly disturbed state of the atmosphere of late, it would be desirable to make careful observations upon the possible relations of these various classes of phenomena.

It appears that some influential parties are about to organize a Company for the purpose of working Mr, Spencer's patent for the use of the magnetic oxide of iron as a filtering material for water; and there seems to be good reason for believing that much good to the public will result from anything which would be likely to bring that valuable material into effective use. One of the most important applications of the magnetic oxide of iron filters would be for the purification and aëration of rain-waters stored in tanks; and on that account we recommend its use, especially to our Dutch friends and correspondents, observing simply that the success of its application depends upon the materials being allowed, from time to time, to renew their stock of oxygen, to use a familiar phrase. Mr. Dales, of Gresham House, we may add, has lately proposed to use the magnetic perchloride of iron for the purpose of precipitating the solid, and some of the suspended and soluble matters of the London sewerage; and it may be inferred that our practical chemists have at length entered seriously upon the application of the powers of some of the metallic salts or compounds to absorb and to liberate oxygen to the ordinary purposes of life.

Whilst Mr. Spencer and Mr. Dales are thus rendering good service to the science of applied chemistry, it is sad to be obliged to call attention to the correspondence between the

Board of Works and Dr. Faraday, on the subject of the preservative processes applied at the Houses of Parliament to arrest the decay of the stone used in that building. Great names in this country are often made to cover great mistakes; and in this particular instance, it would seem that Dr. Faraday has been induced to lend the sanction of his name to an invention of more than doubtful merit. In the paper referred to (No. 309 of this session), it is singular that Dr. Faraday should firstly, have sought his illustrations of the value of a stone-preserving process in the wrong place; and that, secondly, he should have ventured to pronounce a decided opinion on the subject, when he himself distinctly states that sufficient time had not been allowed for either of the processes submitted to him to develope their consequences. Altogether, Dr. Faraday's report on the respective merits of Ramsome's and Szerelmy's processes is, (we say it with all due deference to the name,) a very unphilosophical, and a very unsatisfactory document. It will suffice, however, to shelter the authorities of the Board of Works, and save them from the trouble of thinking and examining for themselves. "*Stat nominis umbra!*" will be their cry.

We began these notes with some remarks on the necessity for a careful revision of the details of the organization of the Poor-Law Board, and we conclude by observing further on that subject, that one point it would especially be necessary to examine, would be, how to prevent the frequent defalcations of the collectors, which take place under the existing farce of auditing the accounts. The collector at Ipswich, and the collector of Marylebone in the Metropolis, have lately swollen the already heavy list of defaulters; and really there seems to be no check upon the abuses of these underlings since the administration of the Poor Laws has become a portion of the duties of the Ministers of the Crown. All parties are, it may be added, interested in the prevention of these abuses; for the Ratepayers, unfortunately, are made to pay a second time the sums thus abstracted in consequence of the defective supervision of the Government Auditors. The Parochial authorities, in fact, trust entirely to that supervision, and neglect to take what they are taught to believe are useless precautions to defend themselves. How broken a reed a Poor-Law Audit may be is, however, proved by the stories connected with the financial history of the City Union, of St. Pancras, of Marylebone, and of Ipswich, which, unfortunately, are far from standing alone.

SOME NOTES ON SICK FUNDS AMONGST WORKING MEN.

There are few subjects connected with the relations of Masters and Workmen (or in other words between Capital and Labour), which are of so delicate a nature, as those which are forcedly brought under notice when sickness, or disease, or accident, prevent the workman from earning his usual means of support. Theoretically, the workman simply sells his services for certain periods of time, and he is paid according to the terms of the particular bargain he may make, or of the custom of trade in the place where he may be at work; and as he would not work beyond the time agreed for without being paid for so doing, so he has legally no claim for payment for the time during which he is not at work, by whatsoever cause that loss of time may be occasioned. It would, perhaps, hardly be worth while to dwell upon this truism, for it need only be stated to be at once admitted; but it almost invariably happens, that when working men fall ill, or meet with accidents, they are found not to have made provision for such contingencies (from inability, alas! quite as much as from inattention); and the masters are, therefore, called upon to contribute to their relief. No doubt the exercise of the kindly feelings, of true charity in fact, thus evoked tends to bind the respective parties together by those ties which are indeed "twice blessed"; but, unfortunately, even these feelings are capricious in their mode of action, and even when of the purest description they are liable to superinduce bad results; because they lead some characters to trust to others, rather than to act and provide for themselves. To us, then, it seems essential that working men should organize their own Provident Funds, and seek to render themselves independent of eleemosynary assistance, in their seasons of affliction under the countless "ills that flesh is heir to." We are proud to say that the majority of the Trades carried on in London have already applied the principle we thus contend for. There are, however, still many workmen who keep aloof from such Benefit Societies; and many trades in which they do not exist at all; and it is for the purpose of keeping the subject constantly before our habitual readers, that we propose from time to time to return to its consideration, with the hope that at length the numerous classes of workmen employed in the manufacture and distribution of Gas, may be induced to follow the example set them by other trades.

One of the first points it is necessary to ascertain before any permanent organization can be established for the relief of working men in sickness, must always be the precise ratio of sickness prevalent amongst the particular trade under consideration; and also the disposition of the persons it is proposed to assist, to remain in the same employ, for the migratory habits of certain workmen frequently disturb the inferences which might be drawn from ordinary observations. The present custom is to divide labour into four classes, and to establish for each of them particular rates of liability to sickness, so to speak; but it must be evident that such a classification as the heavy labour out of doors, heavy labour indoors; light labour out of doors, and light labour indoors, must proceed upon such vague generalizations as to render the results it would appear to lead to very uncertain, even if not false. Mr. Tidd Pratt, for instance, in his "Suggestions for the Establishment of Friendly Societies," classes in the same category of *light labour*, Corkcutters and men engaged in the leather trade, Farmers and Tobacconists; and in the category of *heavy labour*, he groups together Millers, Plumbers, Sawyers, and Sugar Refiners; for it must be observed, that Mr. Pratt did not take into account the difference between trades carried on out of doors and indoors. But it is notorious, that the rates of sickness and of mortality, in such a trade as that of leather making, are greater than those of the cleanly and easy trade of cork-cutting; and that Plumbers and Sugar Refiners are exposed to sources of sickness and accident, from which Millers and Sawyers are exempt. Then again, the class which includes Builders and Agricultural labourers may be reasonably supposed to include Railway makers, such as Navigators, Tunnel men, &c.; but it is notorious, that the sickness amongst Navvies, working in damp clays at the end of a warm summer, is very different from that prevailing amongst the Navvies working at the same season in limestone districts; and the geological nature of the strata in which a tunnel is being executed will materially influence the health of the men employed. From some private information we have obtained, through the kindness of Sir M. Peto, it would appear that a payment equivalent to 2½ per cent. on the wages received, is sufficient to cover the average expense of medical assistance and relief amongst the workmen his firm employs: in the course of executing the Saltwood Tunnel, however, the payment ought to have been nearly 5 per cent., so very heavy was the number of cases of sickness and of accident. In the great Paris Gas Company, it would seem that a payment equivalent to 2 per cent. on the wages is considered to be sufficient to cover the outlay contemplated; and the differences thus shown to exist in different trades of very analagous character, so far as their merely heavy or light nature are concerned, are moreover complicated by the local considerations of salubrity of the districts within which they are exercised, by the habits, and above all by the ages of the workmen employed.

There appears to be this remarkable difference between the moral effect of the relief of workmen in periods of sickness or accident, by means of Friendly Societies organized amongst themselves, or by means of the intervention of the employers, —viz., that in the former case the rate of contribution partakes of the character of a life Insurance, in so much as the rate is lower in proportion to the age of the party entering the Society; whereas, in the latter case, the payment made to the sick-fund is equal (in proportion) amongst all the parties contributing to it. The effect of the former system seems, therefore, to us to be likely to be that habits of prudence would be sooner formed, and that a greater check would be placed to the tendency of workmen to displace themselves at every caprice (a tendency which we believe to have a serious influence on their moral worth and physical happiness), than can possibly exist when the provision against the chance of sickness is merely of a temporary nature. As much of sickness depends upon the previous conduct and mode of life of the parties it is likely to affect, the mere existence of habits of prudence and forethought (such as must exist amongst the workmen who belong to Benefit Societies), is likely to induce them to lead more regular, and therefore healthier, lives than would be the case, with men who trusted to the shop regulations of the em-

ployers who took charge of their workmen's interests. The chances of sickness, so to speak, being thus less, the premium of insurance against its inconveniences must also be less; but, important, though this economical consideration may be, it sinks into utter insignificance when compared with the respective moral consequences of the various systems of relief we have hitherto considered. Habits of prudence, self-restraint, and self-reliance, are at the bottom of all noble and worthy characters; and precisely in proportion as Friendly Societies in contradistinction to Shop or Establishment Sick Funds, or occasional collections, tend to develope those habits, do the former tend to raise their Members in the scale of moral and responsible beings. We are extremely anxious to avoid misconception on this subject, and especially to guard against anything which might appear to exonerate the employers of labour from the obligations of their position. They must be prepared, and ready, to assist their workmen by advice, kind words, and pecuniary and personal service; but the point at which we wish to arrive is this, viz.—that little real good can be effected for the labouring classes unless they themselves assume the burden and the sacrifices, every great social movement involves. It is on this score that we regard the systems adopted by Messrs. Peto, Brassey, and Betts, or by the Paris Gas Company, for the relief of their workmen, in periods of sickness, as being ultimately objectionable in a moral point of view; though, at the same time, we do not see how either of those parties could have adopted a different course from the one they have done, under the existing circumstances of the education and habits of the working men they employ. The great lessons working men have to learn are, to think and to act for themselves, and to trust to their own efforts rather than to the policy or the charity of their employers: *they must learn to do their duty to themselves* before they are justified in complaining of the shortcomings of those whom they too often seek to render responsible for their own imprudence, and bad conduct.

If the working men have thus a direct interest in establishing such a system of insurance against the consequences of sickness, the masters have likewise an interest in encouraging their employed in taking the remedy into their own hands, if for no other reason than because the workmen are only too prone to believe that every attempt on the part of the masters to establish Sick Funds is prompted by a desire to extort money from the men. The late Mr. Cubitt established, for the amusement of his shop tradesmen, a library to which the subscription of 1d. per week was voluntary; but the men never could be made to understand that he lost money by the operation. Messrs. Potter and Jerrold have been assiduously proclaiming, through the length and breadth of the land, that Messrs. Peto, Brassey, and Betts habitually put into their own pockets from £4000 to £5000 per annum out of the Sick Fund they administer; whereas, the facts of the case are that, since 1855, the average total annual receipts on account of that Fund have only amounted to the sum of £2144 nearly, and the average annual expenditure, on its account, has been £2521 nearly: or, in other words, Messrs. Peto and Co. have actually advanced, on the average, £377 per annum, instead of pocketting, as the workmen have been taught to believe, £4000 or £5000 a year. These are hard trials for men to bear who are striving earnestly to better the condition of their fellow-men; for there is nothing more disheartening than to find our motives constantly misinterpreted. It seems, however, to be a law of nature that the men should consider every attempt of their employers to provide against the chances of their misfortune as an attempt to rob them; and, therefore, it is that we repeat that the masters themselves have a species of interest in striving to develope the feeling of self-reliance amongst those whom they employ.

From whatsoever point, then, this question of the organization of Sick Funds amongst working men be considered, it seems to us that the most desirable course is that of establishing Benefit Societies, organized by the workmen themselves, and managed by them. No doubt the persons connected with the National Debt Office may be able to give valuable advice with respect to the Rules to be adopted, and the tables of payment to be imposed. No Government officials can, however, be aware of the countless difficulties, of the strange precautions required to be taken against abuses, in every case; and, indeed, none but workmen are able to cope with the strange characters of too many of their own class. Far be it from us to question the value of the Tables published by such men as Finlaison, Tompkins, and others, of the probabilities of sickness at the various periods of life in some of the broader classifications of trades. Nevertheless, these Tables are avowedly nothing but generalizations; and, as such, they may well lead to fatal results, if adopted without reference to particular cases. Every trade Benefit Society, in fact, requires its own tables of the rates of mortality, of the probability of life at certain ages, and of the probability of sickness; and we cannot but suspect that the researches it would be necessary to make in order to calculate such tables, would enable those who are interested in the welfare of the labouring classes to suggest some practical remedies for many of the evils those classes are exposed to, now uncombatted, because unknown. So far as regards the Gas making and distributing trades; it seems at present to us, that it is desirable for their members rather to establish Friendly Societies to embrace all the branches of the trade, than to trust to local Benefit Associations; and that the first step to be adopted for such a purpose is to collect the statistics required to enable an Actuary to calculate the requisite tables. From all that we have been able to learn on this subject, it would appear that the occupation itself is by no means an unhealthy one, and that the employment is, in the main, tolerably constant. Under such circumstances, the rates of assurance against sickness ought to be comparatively low. At present, however, far too little is known on the sanitary condition of the trade, in its endless details, to allow any one to reason absolutely with respect to it. Upon casual labour of all ages, the rate of insurance required seems to be, in Gas-Works, equal to 2 per cent. of the value of the labour itself; but if the rate of insurance were made to bear its proper proportion to the ages of the persons assuring, and the money so obtained were well invested, there can be no doubt as to the necessity for modifying the rate so ascertained. It is but common justice that the rate of payment, for the purpose of making provision against sickness, should be proportional to the risk, and evidently this must to a great extent be regulated by the ages of the parties insuring. And this consideration, again, constitutes one of the most valid objections to Establishment Sick Funds; for the latter are almost forcedly organized on an equal per centage on the total amount of the wages received by the whole body of the men employed.

The great practical difficulty such men as the large Railway Contractors have to contend with in these cases, lies in the migratory dispositions of their men, which of course renders it difficult to establish amongst them any permanent corporate organization; and it would also seem that the same disposition prevails amongst the French workmen, or at least that the latter have so little confidence in the stability of the Government of their country as to cause them to regard with distrust Benefit Societies which are forced to invest their floating capital in Government securities. Under these circumstances, there is, perhaps, no other course left for the Employers of labour of this peculiar temper, than to enforce a provision against the chances of sickness or accident; nor, if the nature and extent of such provision be carefully explained to the workmen on their entering the particular employment where it is enforced, can there be any injustice in such a proceeding, other than the errors of detail before referred to. Whatever objection may exist to such establishment Sick Funds, they are immeasurably better for the men themselves, than no provision at all; for the masters these Funds are always a source of outlay, trouble, and misconception of their motives in establishing them. It is desirable then to consider these Funds simply as temporary measures, introduced for the purpose of combatting a present evil; and for all parties to strive to establish a sounder and better system of relief, directly the Trades to which the actual one is applied have assumed a permanent and fixed character. In the mean time, we have collected the rules of some Benefit Societies, and of some Sick Funds, from which we propose to give extracts; and we earnestly invite our Readers to favour us with any suggestions or any information they may be able to communicate. It is only by the comparison of independent ideas on subjects of such vital importance that truth can be elicited.

Circular to Gas Companies.

THE hope of the Sale of Gas Act being put into operation by the time fixed seems to be abandoned, even by the originator of the measure; and a short bill has been brought into the House of Lords by Lord Redesdale, and is set down for a

second reading this evening, for the purpose of extending the period at which the Act is to come into operation to one year beyond the 13th of August next. Another object of the bill is to increase the fees to be paid for inspecting and stamping meters to three times the amount named in the Act.

The preamble of the bill states that the amendment has been rendered expedient in consequence of the delays that have occurred in preparing the models of the required measures, which, up to the present time, have not been deposited at the Exchequer office. Some postponement of the time is, therefore, absolutely necessary, owing to the vexatious delays occasioned by government officials; but a whole twelvemonth, as proposed by the bill, is more than needful. The causes of delay have now been removed, and several of the standard measuring instruments are deposited, so that if a year were considered sufficient for bringing the Act into full operation, when all the work was to be done, six months additional ought to be enough now that the work is nearly finished. A deputation from the Gas-meter Manufacturer's Association was to wait on Lord Redesdale yesterday to request him to limit the time; and we trust, the bill will be altered to meet the desire of the trade to put as speedy an end as possible to the state of uncertainty that exists, and will continue until the Act is put in force. A deputation from the same body has also waited on the Middlesex magistrates to present a memorial complaining of the delay that has occurred in the appointment of meter inspectors for the county, and it was understood that the election of inspectors will take place on or before the 19th of July next, provided there be no amendment of the main provisions of the Act in the meantime. So far, therefore, as regards the county wherein the great majority of meter makers in the kingdom have their works, the difficulty caused by the delay in the appointment of inspectors may be considered as set at rest.

The increase of the fees for stamping is another part of the proposed amendment of the Act of last session against which the meter manufacturers entertain very strong objections. The intention of the increase is evidently to remove the objection to the Act raised by the county magistrates, on the ground that the fees at present named are not sufficient to repay the expenses incurred, and that the county funds will be drawn upon to make good the deficiency. The letter of Lord Cathcart, the Chairman of the North Riding sessions, to the Home Secretary, which was noticed in our last number, may be taken as the exponent of the opinions of the county magistrates generally in agricultural districts. They have apparently been induced to entertain that notion by representations of the costly array of apparatus that would be required for testing gas-meters on the most approved plan, with the greatest expedition, and by the supposition that it would be necessary to have several offices so amply provided in various parts of their respective counties. We have seen a circular, addressed to justices of the peace, containing a description, with illustrative drawing, of the apparatus stated to be requisite for the purpose of testing meters, which might well frighten simple-minded country magistrates into supposing that there would be a heavy demand on the county rates, if it were necessary to fit up many offices with such elaborate apparatus. We endeavoured, in the last number of our JOURNAL, to remove the misapprehension on that account by explaining that the Sale of Gas Act is permissive, and not compulsory, so far as regards the scale of expenditure, which is placed entirely at the magistrates' discretion. No doubt a testing laboratory, such as indicated in the drawing alluded to, would be a desirable acquisition to a meter inspector who had much work to get through; but, in places where there would be few meters to test, a much more economical establishment would be sufficient. Such economical arrangements are, indeed, noticed in the description which accompanies the drawing of the more complete apparatus, and the smallest there mentioned might be amply sufficient in agricultural districts.

When the Sale of Gas Act comes into operation, we believe it will be found convenient, both to meter makers and to gas companies, that all meters should be inspected and stamped before they are sold; and in that case the compulsory provisions of the Act as regards the inspection and stamping, would be practically limited to the meter makers themselves, who expect much benefit from its operation. By far the largest portion of the work of inspecting and stamping would be done in towns, where meters are manufactured, and most probably for the convenience of the trade, the inspectors' offices would be situated near their workshops. For such offices it would be economical as well as advantageous to have a complete testing apparatus on a large scale with every appliance that could facilitate the work. In the circular we have referred to, it is stated that with four 10-feet holders, two pressure gasholders, and other suitable apparatus, an inspector with one assistant would be able to test, on an average, four meters per hour; and if we assume the average fees, as fixed by the Act, for meters of different sizes to be ninepence, the amount received for the labour of each day, of ten hours would be thirty shillings, which would considerably exceed the salaries, and the expenses of the office on the most liberal scale of renumeration to the inspector.

It appears, therefore, that even at the slow rate of testing we have assumed, the fees fixed by the Act of last session would more than cover the expenditure, provided the inspector was fully employed, as would most probably be the case with those who inspected the meters from the manufacturers; but if long intervals elapsed with nothing to do, especially if the inspector had to travel from town to town, the fee of sixpence for testing each 5-light meter and under, would most certainly be inadequate to repay the expenses. It would be reasonable, therefore, in such cases to impose higher fees, and as the inspection of meters would with all persons excepting the manufacturers, be a voluntary act, the gas consumer who chose to satisfy himself that his meter was correct by having it tested, could not well object to pay a higher fee.

The conclusion to be drawn from this view of the case is, that in those places where there are many meters to be tested the scale of fees should be lower than where there are few, and that the gas consumers in towns should be charged less than those in villages. Whether such an arrangement be practicable we will not undertake to say; but, without carrying the principle into general application, to which there might he objections, it may be applied with great facility and with great show of justice to the meter-manufacturers, from whom the inspectors would derive a balance of profit at the lowest fees fixed by the Act, and who would be practically the only persons to whom compliance with the provisions of the Sale of Gas Act would not be voluntary. Mr. Deedes, a county member, has carried out his threat of giving notice of a motion for the entire repeal of the Act; but we imagine he will find few supporters in the House of Commons of such a retrograde movement, and that "the previous question," which Mr. Sheridan is to move as an amendment, in case Mr. Deedes persists in his motion, will be carried by a large majority.

Our present issue contains the report of four additional days proceedings of the committee on the metropolitan gas supply, and concludes the case of the promoters of the bill pending before that committee. The case of the gas companies was opened yesterday by Mr. Hope Scott in a manner which indicates their determination to grapple at once with the substantial questions to be settled, rather than to follow the course adopted by their opponents of wearying the committee by answering the complaints of the parochial authorities, although some evidence may possibly be tendered to disprove Mr. Hughes's assertions with respect to the quantity of gas consumed by the public lamps. Degree of purity, illuminating power, pressure, and price, are the real questions to be discussed; and the evidence already given on the two first points, has still further narrowed the inquiry. It is not often that we are able to concur with Dr. Letheby in his views as to the obligations of gas companies, and it is therefore with all the greater pleasure that we read his evidence, so far as it relates to the chemical views of the case; though, when he departs from his special walk, and ventures to give opinions upon engineering questions, he gets beyond his depth, and perils his reputation. His evidence confirms all we have heretofore contended for, in opposition to those who have maintained that it was commercially possible to manufacture gas free from some sulphur compounds, or that it was advisable to purify it completely from ammonia. Dr. Letheby now says that a gas containing 20 grains of sulphur and 5 grains of ammonia in every 100 feet is unobjectionable; and, though we may have something to say at a future time as to the manner in which he ascertains those quantities, we are not prepared to dissent from his opinion on these points. The absolute and chemical freedom of the gas from these ingredients, required by the 18th section of the bill, is thus admitted to be an impossibility, and it will be the province of the committee to determine the extent to which their presence may be tolerated.

In strong contrast to the candid evidence of Dr. Letheby is that of Dr. R. D. Thompson, who contended that sulphuretted hydrogen may be present in gas to an injurious extent, although the sugar-of-lead test failed to detect it. Scientific evidence does not enjoy much credit in our law courts, and it will not be increased by Dr. Thompson's researches into the modes of detecting the impurities in gas.

We reserve our remarks on the engineering evidence given on behalf of the promoters of the bill, till the engineers of the companies have been heard. None of the witnesses have given any direct evidence whatever as to the cost of manufacturing gas in London, or of the expenses of distribution; indeed, the engineering evidence generally has been of the vaguest possible character, and much of it is not very creditable to the persons by whom it has been given.

An inquiry has recently taken place under the Gas-Works Clauses Act, 1847, the object of which has been to ascertain whether the Glasgow and Suburban Gas Company is in such a position as to require it to reduce the price of gas, and we insert in another column the report of the auditor appointed by the authorities to investigate the situation and accounts of the company. The subject has considerable interest at the present moment, when the efficiency of the Act in question, as a protection to the consumer, is contested; and we recommend this report to the careful consideration of our readers.

Correspondence.

THE FLOATS OF WET GAS-METERS.

SIR,—Your correspondents Mr. Sugg and an "Overlooker in the Country" do not seem to be aware that the plan of boxing-off an ordinary float up to the water-line and making a communication with the other part of the meter by piercing a small hole towards the bottom for the purpose of preventing the inlet gas depressing the water, and consequently shutting down the valve—was patented by Henry Medhurst in 1850, and the patent right of which is still in existence.

I think the plan both good and feasible; but it is like many other patents brought out before there has been any particular demand for it.

Mr. Paddon's system of enlarging the float is merely aggravating the evil—and the mode suggested by your correspondent W. E. D.—is simply adding more work without any advantage gained; for, though the balance weight would tend to keep up the float, and make it as he says, buoyant, immediately the water was depressed in the square front, the float would follow it and cut off the gas as at present.

The great point to obtain is, to have the least pressure possible upon the water containing the float; or more shortly,—put the outlet pressure upon the water containing, by any suitable arrangement, which might easily be done by the exercise of a little ingenuity. JOSEPH WILLCOCK.

89, *Chancery Lane, London, May 24th*, 1860.

STEAM-BOILER EXPLOSIONS.

SIR,—In your paper of the 8th inst. a correspondent, writing on Steam-Boiler Explosions, gives the following simple (and to his view) effective plan for the prevention of the same, by proposing to erect a stand-pipe to the height of 15 feet, placing on the top a metal plate calculated to bear only the *safe*-working pressure of the steam-boiler.

He did well to put safe in italics, for what is the safe-working pressure of any given boiler, is a most difficult question to solve. Boilers have been wrought at what men competent to judge have considered a safe-working pressure, and yet have burst with fearful results. The locomotive which exploded in the summer of 1858, at Messrs. Sharp, Stewart, and Co.'s, Manchester, the pressure, as observed upon two spring balances and a pressure-gauge, stood at 117 lbs. to 118 lbs. a minute before the explosion, both valves blowing off freely at the time. That was considered a *safe*-working pressure, and yet the result was an explosion, even although the steam had two outlets, both acting. Now, suppose we apply the stand-pipe to a case of this kind, and calculate, *if it were possible*, the metal plate for the top to stand exactly a working pressure of 118 lbs.; at this pressure the boiler was found to burst, and, of course, would have done so as effectually with the stand-pipe as without it.

The great difference often existing between the strength of different pieces of iron, is another objection to be raised against the use of the stand-pipe, to say nothing of the effect it would have in the condensation of the steam. Lowmoor iron has been known to vary in strength between the limits of 47,426 lbs. and 57,881 lbs. per square inch. The exact strength of a piece of iron cannot be ascertained without its destruction. It will not do to test one piece of iron, and take it for granted that another piece, even of the same nature and of corresponding dimensions, will be of the same strength, for we have seen that a difference has existed in pieces of iron to the extent of 10,455 lbs. to the square inch.

The exact pressure given by a safety-valve can be pretty accurately calculated, and I see no reason why it should not be adopted, in preference to the proposed stand-pipe, with its top plate, the resisting power of which can only be approximated, and perhaps, in some instances, very vaguely.

I am of opinion that, instead of the stand-pipe, it would be preferable to have three safety-valves fixed to every high-pressure boiler, two of which to be open to the engineer, and the remaining one to be locked, the key being kept by a neutral party, to prevent the engineer working at a higher pressure than is consistent with safety. It is not at all likely that these three valves could be out of working order at the same time, and they would afford free egress for the surplus steam, thus relieving the boiler from the additional strain imposed on many of them by their inefficient safety-valve capacity. But, even with all this precaution, I have no doubt unaccounted-for explosions would occasionally occur.

Gas-Works, Leven, Fifeshire, JAMES C. ADAMSON.
May 18, 1860.

Register of New Patents.

2445.—JOHN ZUILL KAY, of Dundee, N.B., gas engineer, for "*Improvements in gas-meters and in apparatus for maintaining or preserving the levels of liquids.*" Patent dated Oct. 26, 1859.

This invention relates to the securing of an equitable water-level in gas-meters, whereby unjust measurement of gas will be nearly or wholly prevented. In the ordinary meters, this is effected by the introduction or formation of two separate hydraulic chambers, having communication with each other at their lower ends. One of these chambers is longer than the other, and has an opening at its upper end leading into the drum-case, through which the gas passes from the measuring-drum to the discharge-pipe, and thence to the burners. The other chamber has a small tube or dip-pipe in connexion with and leading from its upper end, dipping into the water a little below the proper water-line. Into that chamber, which is in communication with the drum case, is introduced a discharge or outlet-pipe. This pipe is carried down from the top of the meter, and within a very short distance of the proper water-line, and is curved forwards towards the outside of the meter—its open lower end being flattened and elongated, so that the same area may still be preserved. Into this chamber there is also the filling-tube. It is obvious that both these chambers will be filled with water before any water can get into the drum-case. The water itself passes down the dip-pipe, fills the drum-case until it rises to its proper level, and discharges itself into the waste-water box from the overflow. This overflow-pipe being cut to the proper level, too much water cannot by any means be introduced into the meter so as to register against gas consumers; neither can gas be consumed, when the water is so low in the meter, as to register more than 3 per cent. against gas makers, at the same time giving a full supply of gas to the consumer until the water is reduced to this limit of 3 per cent. The dip-pipe and chamber, which are in connexion with each other, contain columns of water of equal depths, acting as a syphon upon the other chamber which is in connexion with the drum-case, and always maintaining within that chamber the same liquid level as that of the water in which the dip-pipe is immersed. Should the water in the meter by any means fall below the mouth of the dip-pipe, the equilibrium of the columns is immediately destroyed—the water falling in the one chamber and rising in the other, and sealing the discharge-pipe so effectively that gas cannot by any means get to the burners until the meter be again filled with water. This arrangement dispenses altogether with the unsatisfactory valve and float as ordinarily used. There are several available modifications in the application of the hydraulic valve and combinations. First, it may be introduced into the front chamber of the meter, and in that case, to prevent tilting, the overflow-pipe is carried from the back along the bottom, and thence into the waste-water box in the front of the meter. The gas is introduced by a suitable arrangement—first, into the waste-water box, and then by a closed bent syphon-pipe into the measuring-drum; and by these means there is obtained the same water level in the drum-case and front chamber, both being subject to the same or outlet pressure.

In the second modification, the hydraulic valve, with its combinations, is attached to the back end of the meter; on the front end are arranged the registering apparatus, inlet-pipe, overflow-pipe, gas-syphon, and waste-water box. By the application of the hydraulic valve and its combinations, tilting can be altogether prevented.

In the first modification, the overflow-pipe, being at the back end of the meter and the hydraulic valve in the front chamber, if the meter be raised off its level and thrown back, the water will be discharged by the overflow-pipe into the waste-water box, and thus unseal the mouth of the dip-pipe, or in the case of being thrown forward, the water will rise in the chamber of the hydraulic valve containing the discharge or outlet-pipe, and effectually seal it.

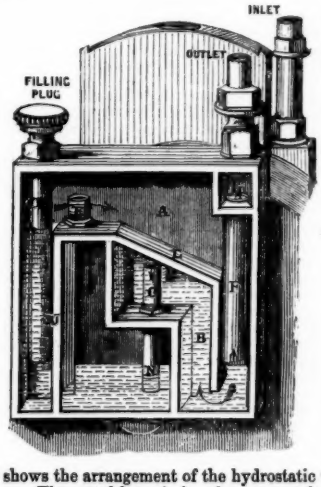
In the second modification, all the actions of sealing and unsealing through the effects of tilting are identically the same as already described. In the compensating meter, an open rectangular chamber above the waste-water box is employed as a fountain or reservoir of water to supply the waste through evaporation; and in this chamber there are introduced the hydraulic valve and combinations, together with the equilibrium chamber. The inlet gas is introduced by a suitable arrangement, first into the waste-water box, and then by a closed bent syphon into the measuring-drum. A tube is provided to carry off the gas from the fountain when it is being refilled with water; a small conically-shaped tube, having its larger diameter projected into the fountain, and its lesser diameter fixed to the side of the equilibrium chamber in such a manner as to be easily shifted upwards or downwards. The overflow-pipe is put at the end of the meter, opposite to that to which the aforesaid arrangements allude, and it is carried along the bottom, and thence into the waste-water box. In these arrangements, so soon as the water fills the chambers of the hydraulic valve, as before described, it will flow down the dip-pipe, and in this case into the fountain, until the fountain be filled, when, by a suitable

arrangement of parts, the water then flows into the drum-case, and, when the proper level is attained, it passes through the overflow-pipe into the waste-water box; but the water will never flow into the drum-case until the fountain is filled. The equilibrium chamber is a small rectangular chamber, extending from the top of the fountain to a short distance below the proper water-line, having a communication with the drum-case at the top end, and therefore subject to the outlet pressure. The object of this chamber is to prevent the water in the fountain from flowing into the drum-case at every variation of pressure or temperature. The conically shaped pipe being attached to the side of the equilibrium chamber at the water-level, admits gas in small globules into the fountain when the water in the drum-case through evaporation falls below the proper level, and continues in action until that level be obtained. By that means the water in the fountain passes into the drum-case through a small nozzle provided for the purpose, or through the opening or bore of the drum-spindle bearing. The construction of the parts of this meter with its arrangements is such that fraud by tilting or otherwise is entirely prevented.

When the meter is thrown a little forwards, the outlet or discharge-pipe, is sealed; if thrown backwards, the water in the drum-case is discharged through the overflow-pipe into the waste-water box, and the water-level in front of the meter being too low, and therefore below the conically-shaped pipe, or gas-nozzle, gas is admitted into the fountain, and water from the fountain into the drum-case, and thence into the waste-water box, until the water-level in the fountain falls below the mouth of the dip-pipe, when the equilibrium in the column of water in the hydraulic valve is destroyed, and immediately a stoppage of gas from the meter ensues.

In another modification of this compensating meter, the fountain, equilibrium chamber, hydraulic valve and combinations, are placed at the back-end of the meter, and on the front are the registering apparatus, inlet-pipe, gas syphon, overflow-pipe, and waste-water box.

The common meters now in use being totally inadequate to the requirements of the new Sale of Gas Bill, only require that they be furnished with the hydraulic valve, which, if properly attached to the back-end of such meters, make them equal, in every respect, to the requirements of the said Act, no alteration being necessary in the front chambers of such meters. They will give a full supply of gas to the consumer, until the water-level is reduced to register 3 per cent. slower—fraud by tilting being at the same time prevented. The hereinbefore-described arrangements for the maintenance or preservation of the levels of liquids, are also suited for the preservation of the levels of liquids in steam-boilers, cisterns, and other apparatus.



The drawing shows the arrangement of the hydrostatic valve-box at the back of the meter. The metal box, A, is of a rectangular figure, and an internal compartment is formed therein by the partition, J. In the space formed between the side of the box, *A*, and the partition, J, the filling-tube, *K*, is fitted, which extends low down into the meter. Extending from the partition, J, is a second partition, L, which is carried downwards in an angular direction, and then vertically, terminating within a short distance of the bottom of the box, A. The central compartment, D, which is formed by the enclosing partition, J, communicates directly with the meter-case, and the water is conveyed thereto by means of the tube, N, which extends very nearly up to the top of the partition, L. With this arrangement, when the water is poured into the meter by the pipe, *K*, it flows into the compartment between the box and the partition, J, and flows over the top of it, and down the partition, L. As the water continues to be poured in, it rises up into the compartment enclosed by the partition, L, and, having driven out the enclosed air or gas, the water flows down the tube, *N*, into the compartment, D, and from thence into the body or measuring-chamber of the meter. The water having access to the front box of the meter, it continues to rise therein until it reaches the overflow-pipe, which stops its further ascent. The level of the water is now the same within the front box, the meter-case, the compartment, D, and the space external to the partition, L. The gas, after being measured, flows into the compartment, D, and passes off by the tube, E, and into the box, *A*. The gas flows off by the pipe, F, into the small compartment, G, in which is fixed or cast on the box, A, a horizontal diaphragm, to prevent the introduction of any instrument for the purpose of drawing off the water, and so causing the meter to register against the company. From the compartment, G, the gas passes off by the outlet-pipe to the burners.

With this arrangement of wet gas-meters, it is impossible to fill them beyond the proper level, so as to cause them to register against the consumer; consequently, they afford perfect protection to the public. On the other hand, the improved arrangement also prevents fraud on the part of the consumer, for if the meter be tilted forward, a portion of the water will flow down the overflow-pipe into the waste-water chamber. The effect of this diminution of the water in the meter will be to unseal the tube, *N*, and this will destroy the hydrostatic equilibrium, and so cause the water enclosed by the partition, L, to fall and seal the pipe, F, and thus prevent the flow of gas to the burners. This state of things will continue until the meter is restored to its level, and a supply of water poured in equivalent to the quantity which has run off by the overflow-pipe. So, also, if the meter be tilted in a backward direction, the water being thereby thrown out of the level, it rises in the compartment outside the partition, L, and so seals the pipe, F, and stops the flow of gas to the burners. In this way, gas-meters of the ordinary kind may be readily altered to meet the requirements of the recent Act of Parliament for regulating the sale of gas, by simply fixing one of these hydrostatic valve-boxes to the back of the meter.

The claims are—

1. The general arrangement and construction of meters, or apparatus for measuring and registering the consumption of gas, as hereinbefore described, and shown in the accompanying drawing.

2. The system or mode of arranging and constructing wet gas-meters with hydrostatic valve-boxes, which are so arranged as to ensure the proper water-level in the meter, and the prevention of frauds by the sealing of the outlet-pipe, upon the meter being tilted either forwards or backwards, as hereinbefore described, and shown in the accompanying drawing, or any mere modification of the same.

3. The system or mode of arranging and constructing gas-meters of the compensating class, in which the hydrostatic valve-box, with its reservoir and appurtenances, are arranged to compensate for the diminution of the water, and to prevent the tilting of the meter for fraudulent purposes, as hereinbefore described, and delineated in the accompanying drawing, or any mere equivalent therefore.

2488.—Charles Read, of Birmingham, ironmonger, and Alfred Isaac Read, of Smethwick, near Birmingham, draughtsman, for "*A new or improved tap or stop-cock.*" Provisional protection only obtained. Dated Nov. 1, 1859.

This invention consists of a tap or stop-cock, constructed in the manner hereinafter explained, and capable of drawing off, from different reservoirs or cisterns, one or other of the liquids contained in the said cisterns, and delivering the same at one mouth or delivery-pipe. This invention is principally applicable for drawing off, at the same mouth or delivery-pipe, hot or cold water at pleasure, but may also be employed for drawing off different liquids, steam, or gas, or a liquid and steam or gas.

The tap, or stop-cock, consists of a barrel and plug, like an ordinary tap; but, instead of the ordinary water-way passing diametrically through the plug, there are three water-ways made, each of the said water-ways proceeding from the surface of the plug, and opening into one another in the axis of the plug. Instead of having one supply-pipe on the barrel of the tap, there are two of the said supply-pipes, the two supply-pipes and the delivery-pipe upon the barrel of the tap being at the same plane, and inclined to one another at the same angle as the three water-ways in the plug. It is preferred to place the two supply-pipes and the delivery-pipe at points equidistant from one another, but the inventors do not limit themselves to any particular angle or position either in the said pipes or in the water-ways in the plug.

In using the tap, one of the supply-pipes is connected with one of the cisterns or reservoirs from which the tap is to draw, and the other supply-pipe is connected with the other reservoir. By turning the plug by means of its handle, the delivery-pipe, or mouth of the tap, is put into communication with one or other of the reservoirs, and the desired liquid drawn off. The proper position of the plug is determined by means of stops, which limit its motion.

2501.—Charles Bacon, of Edgeware Road, London, Esquire, for "*Improvements in globes and shades for gaslights and oil or other lamps.*" Patent dated Nov. 3, 1859.

This invention consists in forming globes and shades for gaslights and lamps with an interior globe or globes, the space between the outer and inner globes forming receptacles for water or other clear liquid, plain or coloured, as may be desired. The spaces between the outer and inner globes may, one or all, be filled with liquid according to the power of lights required to be obtained; and the inner globe may be formed either of solid glass, bored or cut through the centre, or in compartments, in a suitable manner, or hollow, the interior being filled with water or other clear liquid. Any number of globes may also be added, with lights systematically arranged according to the illuminating power required, and which can be still further increased by a peculiar adjustment of reflectors. In some cases the globes may be of solid glass, bored or cut, with a six or eight-sided hole, or the whole may be fluted or grooved in the interior; and around the centre hole may be formed other vertical holes, which do not pass entirely through the glass, thus forming receivers for clear liquid, and reflecting the lights from the centre or chimney.

Where much light is required, the burners may be placed around the inner globe, which may be either solid or hollow, and filled with water—the centre opening being used for the oil or gas tube to pass through, which supplies the burners; or the burners may be arranged in triangular quadrilateral or other form around the inner globe or globes; and the outer double globe, filled with liquid, may also be used. Thus the light is reflected from one globe to the other, increasing the power of the light, which may be still further increased as required by the adjustment of reflectors. This invention is alike applicable to railway and other signal lights.

The claim is for the making of globes and shades for gas, oil, or other lights in the manner herein described, and for the purposes set forth.

2551.—John Dales, of 11 and 12 Gresham House, Old Broad Street, London, for "*Improvements in applying deodorizing fluids to sewers and other receptacles of sewerage.*" Patent dated Nov. 9, 1859.

This invention has for its object improvements in applying deodorizing fluids to sewers, and other receptacles of sewerage. In order to apply deodorizing fluids to sewers, a tank is employed capable of containing the

requisite amount of deodorizing material, to be supplied to the sewer at the spot at which the tank is situated, during several days, and from the bottom of this tank a pipe passes into the sewer. It is preferred to form the tank beneath the surface of the ground; and when the sewer runs along a road, that the tank should be under the footway, and at the side of the tank a shaft is formed, which passes up to the surface of the ground, and is covered with a moveable door. In this shaft there is a glass gauge communicating with the tank, which indicates the amount of deodorizing fluid in the tank. The pipe from the bottom of the tank also passes through this shaft, and on the pipe there is a tap or plug, which is connected with suitable apparatus, actuated by clock-work, for turning the plug more or less at different times of the day, so that more deodorizing material may be supplied to the sewer at those parts of the day when more sewerage matter is passing through the sewer than at others. This clock-work and apparatus is contained within the shaft. The tank may be filled with the deodorizing fluid through a pipe passing from the shaft into the upper part of the tank.

In a similar manner, a tank or reservoir and apparatus may be applied to other receptacles of sewerage. When applied to a water-closet, the supply may be constant, or the apparatus may be arranged to act simultaneously with the ordinary supply of water to the closet, by connecting the key or handle, cock or tap, on the pipe from the tank or vessel containing the deodorizing fluid, with the cock of valve by which the ordinary supply of water is obtained.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

1173.—THOMAS NASMYTH, of 31, Rue de l'Etoile, Brussels, for "*Improvements in taps and valves.*" A communication, May 11, 1860.

1177.—WILLIAM SENIOR, of Wakefield, in the co. of York, gentleman, and WILLIAM STATTER, of the same place, surgeon, for "*Improvements in purifying gas, and thereby obtaining a useful product.*" May 12, 1860.

1207.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, London, for "*An improved mode of treating oils for the production of gas and volatile oils.*" A communication, May 16, 1860.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

2717.—CHARLES ANTOINE FOURNIER, of 60, Boulevard de Strasbourg, Paris, for "*A process and apparatuses intended to find out the escapes of lighting gas from the conveying pipes, and to determine the precise leaking-places of the said pipes.*" Dec. 1, 1859.

159.—BENJAMIN JOSEPH SPEDDING, of Birkenhead, in the co. of Chester, gentleman, for "*Improvements in apparatus for generating gas from oily and fatty substances, and in coolers and holders, or gasometers.*" Jan. 21, 1860.

838.—HENRY JONES, of Old Street, St. Luke's, London, and JOHN JONES, of St. Paul Street, New North Road, London, gas-meter manufacturers, for "*Improvements in wet gas-meters.*" Mar. 31, 1860.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

445.—THOMAS BELL and RICHARD CHRIMES, "*Certain improvements in valves applicable to the receiving and discharging of water or other fluids.*" Feb. 21, 1853.

592.—JAMES KIMBERLAY, "*A new or improved gas-stove.*" March 9, 1853.

630.—ROBERT CHRISTOPHER WITTY, "*Improvements in the manufacture of gas.*" March 12, 1853.

Parliamentary Intelligence.

HOUSE OF COMMONS.

MONDAY, MAY 21.

(*Before the Right Hon.* T. SOTHERON ESTCOURT, *Chairman, Messrs.* PACKE, NORTH, *and* TURNER; *and Lord* ROBERT CECIL.)

METROPOLIS GAS REGULATION BILL.

(*Continued from page* 340.)

Mr. RICHARDS said that Mr. A. A. Croll wished to give evidence in reference to some allegations in the Great Central Gas Company's petition, to which the attention of the committee had been specially directed during the cross-examination of Mr. Hughes. The allegation was, "That at the time of the incorporation of your petitioners, a contractor entered into an arrangement to make gas for twenty-one years, for the price of 1s. 9d. per 1000 feet at the consumers' meter; that the contract occasioned great loss, and the contractor was unable to fulfil it; that your petitioners afterwards placed the contract in the hands of another contractor, who likewise failed to carry it out, and afterwards became bankrupt."

A. A. Croll, Esq., called, and examined by the CHAIRMAN.

Are you the individual spoken of as the first contractor?

Witness: Yes.

The CHAIRMAN: Do you conceive that those words affect your character?

Witness: I do.

The CHAIRMAN: Are they true literally, or have you any explanation to offer with respect to them?

Witness: There is not any approach to truth in them.

Mr. *R. R. Arntz*, further cross-examined by Mr. RICHARDS.

In my last answer, I stated that, if the streets had been more broken up since the districting than before, I believed it might be due to the arrangements consequent thereon, and to be merely arising from that temporary cause. The charge made by the Equitable Company for the public lamps, has been increased since the districting from £3. 17s. 6d. to £4. 2s. 6d. The Equitable Company before the districting probably did light 53, and the London Company 22, lamps. The price paid to the London Company before then was £4. 10s., and those 22 lamps may have been taken by the Equitable at that time. Probably, the £4. 2s. 6d. may be something like the mean between the two prices; but the mean will not apply. I do not know what the aggregate sum paid for the Equitable and the London together was before the districting, nor that the entire increase of charge after the districting, when the Equitable took the lamps formerly supplied by the London, was £5. 15s. per annum. I suppose it is so, that they reduced the price on the 22, which they took from £4. 10s. to £4. 2s. 6d. It is possible that in October and November, 1857, and in the course of 1858, the public lamps were increased from 77 to 93; a large number was added about that time. I mentioned, as a grievance, that the total paid for lamps since the districting was greater than before the districting; and I have no doubt I have taken lamp for lamp in calculating those sums. The £4673, which I said was paid for the whole of the Westminster district, included the lamps supplied by the London, Equitable, Chartered, and Western Companies. I have not gone into the amounts charged by the separate companies; I have taken the whole number of lamps.

The CHAIRMAN: It is impossible to arrive at your conclusion, is it not, unless you take the lamps individually, because there are three parties contracting at different prices?

Witness: I took the separate contracts, but I have them here in mass only, so that I have endeavoured to show to the committee what the effect upon the whole is. I have not the figures before me now that will enable me to answer the question sufficiently.

Mr. RICHARDS: In November, 1859, do you remember the London Company making an application to the Westminster District Board for permission to lay a main, and the board making the company pay £150 for permission to lay the main?

Witness: I know what you mean; I do not remember that version of it. They had to pay £150 for making good the street, and the ordinary bill for repaving—but that requires a little explanation. The circumstance to which the learned counsel alludes is this—the London Company at that time requested permission to lay a very large main; is was the first of the large mains, to the best of my recollection, that was laid through the district—it was of considerable width, and laid down at a considerable depth; and the board then thought that the same amount of injury would be done to the streets, as is usually done by a trench dug for a sewer, which invariably ruins a street, however well you may make it good as a mere question of repair. The board, therefore, then required that the company should pay, in addition to the ordinary cost of repair, the cost, at the same time, of relaying the whole; and that, I believe, was estimated by myself at £150; I being privately instructed by the board to take a very liberal view of the case. The work was not actually done, because the company afterwards elected to run along the footpath instead of along the carriage road. Some conversation afterwards passed between the secretary of the company and myself, as to whether the main having been run along the footpath instead of the carriage road, the board would not remit the sum of £150; and I believe that that would have been done if the secretary had not been unwise enough to endeavour to purchase my goodwill in a manner which made it impossible that I should move in it any way. He proposed to put bank notes into my hands, in order that it might facilitate the matter with the board.

By the COMMITTEE: He proposed to bribe me, in fact; but I rejected it, saying, "If you now even apply to the board, I shall be obliged to state what has occurred."

By Mr. RICHARDS: I had a very large amount of extra trouble in the matter. I have not the slightest doubt the money was offered in order that I might facilitate the return of the £150. The secretary said, in these matters, they usually smoothed the way. The company were made to pay the £150; and they would have got it back but for that, because they did not do the injury they anticipated. They ran along the footpath instead of along the carriage-road; and if they had applied to the board on that ground, they would have got it back, as they did not do the injury, to guard against which the £150 had been demanded of them. The application was never made to return the money. I do not say that we kept the £150, for which no consideration was ever received; but you may consider the state of facts has that effect, as the £150 was received in anticipation of permanent injury to the carriage road, which injury was not done. I am not aware of there being a very general feeling on the part of the public that the public lamps should be supplied by meter. The opinion has been expressed at our vestry. I attend no other vestry than our own. I do not know whether it is so stated in any of their petitions. I have not read them. I have not even read the bill, and do not know whether there is any clause in it proposing that it should be done. It would be their business, not mine, to express such a desire in their petitions, if there were a strong feeling that way. I have read the Sale of Gas Act. I think the inspectors under that Act are to be appointed by the magistrates. I should be sorry to give an opinion as to whether that mode of appointing them is a proper one.

The CHAIRMAN: Would you prefer that the inspectors should be appointed by the local board, rather than by the county magistrates?

Witness: I should.

By Mr. RICHARDS: I should most decidedly object to the gas companies having the appointment of the inspectors, as they would then have entire control over them. On the face of it, the gas companies, inasmuch as they enter into contracts with the local boards, may as reasonably object to the local boards appointing the inspectors; but it is an every-day thing that the architect or engineer engaged by the employer is agreed to as sole arbitrator between the contracting parties. That is a matter of arrangement, if both choose to agree to it. On the face of it, it is unreasonable that an Act of Parliament should give a right to one of the contracting parties to appoint the inspector, whose dictum is to bind the other contracting party; but it is a matter of every-day practice in private contracts. It might be reasonable that the inspectors should be appointed by some one strictly impartial between both; but, in practice, that question does not arise.

Re-examined by Mr. WEBSTER: I have not myself made any suggestion about the party by whom the inspector should be appointed. In my opinion, the board have been liberal in their treatment of gas companies, as regards the laying of mains. I know that the board did allow a main to be laid by the Equitable Company down Parliament Street; but I am not aware that the Commissioners of Works refused to allow it. That main was laid down after the districting, and not a foot of gas was taken off the main through our district. With reference to the supply of gas to the public lamps, I think that some better proof of the fulfilment of the contracts than we now have should be found, and I know of no better plan than that of burning by meter. I have here the photometer which I use in making experiments. [Witness explained the working of the photometer.] The experiments are made by the eye, judging of the similarity of the two shadows. I said that, although two observers might differ to a small extent in single observations, the result of my experience is that, on a number of observations they would concur.

Mr. WEBSTER applied for a summons for Mr. Thomas Edge, a meter-maker, of Peter Street, Westminster, application having been made to him, and he having declined to attend, unless he was summoned.

The committee acceded to the application.

Mr. *William Francis Jebb*, examined by Mr. WEBSTER.

I am clerk to the Westminster Board of Works, and have been so since the Metropolitan Local Management Act came into operation. In April, 1857, I was instructed by the board, to give notice to the Equitable, Western, Chartered, and London Gas Companies to determine their contracts at Christmas of that year. Those contracts had been entered into with the preceding paving commissioners. The special object in giving the notices was that the board wished to facilitate the re-arrangement of the lighting of the districts, so that the contracts might be all in one form, and terminate at one period. In Oct., 1857, I was directed to insert advertisements for tenders for lighting the district; and I wrote also to the different gas companies who had the lighting within the district, calling their attention to the advertisement, and asking for tenders. We received tenders from the Chartered, Equitable, and Western Companies; the London refused to tender. The London Company had previously lighted the Tothill Fields district, Parliament Street, Whitehall, and that neighbourhood. The form of tender which was sent in, did not conform to the tender sent out. The Chartered Company struck out from the form of tender furnished to them, such parts as would have the effect of altering the then existing form of contract. They specially objected to the clause prohibiting the opening of ground for particular purposes without the consent of the board. They wanted to retain the old contract, which, they alleged, gave them power to do it without the board's consent. The Equitable sent in their own form of tender, and, in addition to the objections made by the Chartered Company, they also objected to specify either the quantity or description of gas with which the required light was to be given. The Western Company also sent in their own form of tender, and, in addition to the objections made by the two last-mentioned companies, they objected to specify the number of standard candles to which the lights would be equivalent. The board provided a plan showing the districts which they wished to be lighted, that the companies might tender for any portion of each; but the companies did not refer at all to the plan so submitted to them. The board did not succeed in getting the district lighted according to the divisions they wished, but the companies insisted upon adopting their own divisions. The Chartered took the larger district, the Western took the hamlet of Knightsbridge, and the Equitable took a portion of the district west of Vauxhall Road. At that time, it came to the knowledge of the board that the Chartered Company tendered for the lighting of St. Marylebone for £4 per lamp, which was a considerably lower rate than was proposed to them. I was directed to write to the company to know the reason, and the Secretary replied that, among other reasons, it arose from the company being rated much higher in our district than in other parishes. My letter to them was dated Nov. 28, 1857, and their reply was Dec. 1. Our board had nothing to do with the rating. The board experienced difficulty in getting the contracts entered into, and were unable to succeed in the form they wished. Mr. Arntz's statement as to the prices charged is correct, and also as to the quantity of light. The contracts were to continue from year to year with six months' notice from either party. In March, 1859, we applied to the companies to know at what price they would be willing to supply the public lamps, the board wishing to take the lighting and cleaning into their own hands. The Chartered Company replied that the letter of the board should have attention as soon as the present unsettled state of the gas question enabled them to do so. A similar application was made to the Equitable Company, and they stated that, as the present contract could not be terminated by either party before Christmas, 1859, in the absence of any nctice, the directors felt it would be premature to entertain the proposal. The Western Company replied to the same effect. The Board then directed me to write to the companies, to say that they did not think it was at all too early to commence arrangements with respect to the future arrangements, considering the difficulty which they had in 1857. I applied in April, 1859, to the Chartered Company for the data upon which the charge of £4. 7s. 6d. per lamp was made. They were then charging in St. George's, Hanover Square, £3. 14s. 6d. for a similar supply of cannel gas, and in St. James's, £3. 13s. 6d. I do not know the date of these contracts. I addressed a similar letter to the Western Company, who were then charging us £4. 10s. 6d. per lamp. At that time, they were charging in St. George's parish, £3. 14s. 6d., and in St. James's £3. 13. 6d. per lamp. I obtained no reply to my preceding letter from the Chartered Company. We did not apply to the Equitable Company for any data upon which they made their charge. With regard to the proposal to supply the public lamps with gas only, the Equitable replied that, as long as the gas was supplied to the public lamps without meter, the company could not undertake to supply the gas otherwise than through the agency of their own lamplighters, and so on. The Western company advised us to adopt a contrary course to that which we suggested. At that time, the question of the supply of gas to the metropolis was before Parliament, and they referred to the matter being then in agitation. The Equitable and the Chartered companies gave notice, in July, 1859, to determine their contracts. I believe there was an application made to the gas companies at one time for permission to fix an instrument called "Sugg's Regulator," to the public lamps.

Mr. *Hughes:* One of the regulators I produced here the other day is the one now referred to.

Examination continued: The Chartered Company replied, on the 24th of June, 1859, to the following effect:—

Sir,—I am directed to acknowledge your letter of the 20th inst., expressing the desire of your board to test the power of "Sugg's Governor" to maintain an uniformity of light in the public lights by attaching said governors and meters to six lamps, in places specified, said lamps to be lighted and extinguished by the company's servants as usual, and to say, in reply, that the directors decline to concur in such a course, inasmuch as it would quite alter the mode of burning, and might render an increased pressure necessary, not only in this parish, but all over their other districts.—I remain, &c., C. BURLS, Secretary.

The Equitable Company agreed to the proposal, subject to the company's officer having access to the meter to take the register, in the usual way. The Western Company stated that the directors would prefer the board taking their own course with regard to any experiments they might desire to make, without the company being a party to them.

Mr. BURKE: Will you show me the letter you wrote to them?

Witness: I addressed the following letter to each of the three companies. It was dated June 20, 1859:—

Sir,—The Board of Works for this district being desirous of testing the power of Sugg's governor to maintain an uniformity of light in the public lamps, desire to attach such governors and meters to the lamps mentioned on the other side for such purpose; the lamps to be lighted and extinguished as usual by the company's lamplighters. I am directed by the board to request the favour and concurrence of the (Chartered) Company in the matter.—I am, &c., W. F. JEBB.

By Mr. WEBSTER: In August, 1859, in consequence of the notice given by two of the companies to determine their contracts at Christmas, application was made to them to know upon what terms they would continue the supply of gas to the public lamps. The Chartered wrote, on 19th of August, stating terms and conditions which were more in favour of the company than under the existing contract. The Equitable wrote, stating their terms, and objecting generally to the conditions of the previous contract, without stating any specific objection. We then sought an interview with the Chartered, and also requested further particulars from the Equitable Company. A committee was appointed to meet the directors of the Chartered Company, who granted an interview with the board on the subject. The committee went, and the result was, they refused to alter their terms, except as to the penalties, which the board were willing to give way upon. That result was the subject of a report, dated the 12th of October, 1859, and a long correspondence ensued with the company, in the course of which the question of the supply by meter was referred to. On the 14th of October, 1859, the board proposed that the consumption of gas should be ascertained by means of one meter to be fixed at every twelfth lamp, and the price to be charged per 1000 feet to be referred to arbitration. That was not assented to, and, on the 20th of October, the board advertised for tenders. We received a tender from the Equitable Company, and a tender from some parties for lighting with oil. The Chartered Company did not reply to the advertisement. They had before refused to supply gas to be measured by one meter to every twelfth lamp. They were willing to agree to a meter being fixed to every lamp in the district. They wished also to have the power to open the ground, for the purpose of laying new mains, without the consent of the board being first obtained; but the board would not give way upon that point.

By the COMMITTEE: The Equitable Company stated that they had no objection to supply by meter, but they objected to our suggestion of one to every twelve. They said, if we could propose something more consonant with their views, they would assent to it.

By Mr. WEBSTER: In all these negotiations the companies insisted upon retaining the power of opening the streets as they pleased, but the board would not assent. The matter was then referred to a committee, to endeavour to make terms with the companies. It then got to November, near the termination of the contracts, and terms were at length made for one year, ending Christmas, 1860. The Chartered Company were to have £4. 5s., and the Equitable £4. 2s. 6d., per lamp. I believe the contracts were made for so short a time in consequence of these proceedings.

Cross-examined by Mr. BURKE: I am the clerk of the district board to which Mr. Hughes, the last witness, belongs. It was I who issued the circular asking all persons, who had any complaints to make on the subject of insufficient supply of gas, or inadequate pressure, or other things, immediately "to communicate the same by letter addressed to me." I suppose that the vestries and local boards look to Parliament to propose some remedy to meet the difficulties which they experience in dealing with the gas companies. I am not prepared to offer any opinion upon the subject. Whatever remedy is proposed, should be one that is fair to the companies as well as to the consumers. I do not know that the public lamps have always been, and are now, supplied at a price per 1000 feet less than to private consumers. I have referred more particularly to the conditions which the companies have insisted on in their contracts with the parishes. The Chartered Company replied to my communication to the effect that they tendered in Marylebone at a lower price than in our district, because they were rated less there. I do not see what that has to do with it. The parish benefits by the rating. I cannot answer your question as to whether they benefit by a lower price for gas. The public lamps are paid for by a rate upon the inhabitants. The money extracted from the gas companies in the shape of rates goes into the general fund. I do not think that the reason the company gave for charging a higher rate for the public lamps was a good reason in this instance, because the board had nothing to do with the question, whether their rates went up or down; the board did not rate the works. Of course, if the lighting of the public lamps is low, the parishioners benefit; and if you mean the parish, in the same sense as the board, it is the board that have to do with it. I have not heard the subject discussed, and cannot tell whether the board agree with me in that view. I cannot assign a remedy. The companies, in all cases in the renewal of their contracts, desired the power to open the streets without the consent of the board. I cannot tell whether that power is conceded to all companies. Everywhere, except in London, our board refused to give up the power which the Metropolis Local Management Act conferred upon them. In 1857, the board terminated the contracts with the companies.

Re-examined by Mr. WEBSTER: The companies determined the contracts in 1859. The works of the Chartered Company are in our parish, and in the other parishes there are only mains. I believe that the vestries rate the companies in the way which they consider just and equitable. I cannot give you an opinion upon the rating. I have not looked over the clauses of this bill. I do not know the quantity of gas in each case consumed by the public lights. One of the conditions which the companies demanded was, that they should have the control of the quantity of light afforded.

Henry Letheby, Esq., M. D., examined by Mr. WEBSTER.

I am professor of chemistry in the London Hospital, and chemical referee to the Corporation of London as to the quality and illuminating power of the gas supplied by the Great Central Gas Company. I was appointed by the Common Council of the Corporation of London. My reports are sent through the Commissioners of Sewers, but the appointment is in the hands of the Common Council. I have held that appointment eight or nine years. I am well acquainted with the manufacture, chemical qualities, and illuminating power of coal gas. My duties as a chemical referee are to examine regularly the illuminating power and chemical quality of the Great Central gas supplied to the City of London, and to report to the Corporation every three months the average of the results of those examinations.

Mr. WEBSTER: Having had your attention directed to this subject for a great many years, what is your opinion upon the question; what ought to be the least illuminating power of the gas supplied?

Witness: I can tell you the actual fact in regard to my experiments, and from that I can form an opinion. The fact is this, that, in the course of the last eight years, I have made nearly 4000 experiments upon the illuminating power of the Great Central Company's gas, and the results are—that the illuminating power for the whole year is 13 sperm candles in the City or 14·87 wax candles, the gas burning 5 cubic feet an hour, from an argand burner of 15 holes, with a seven-inch chimney. I think as an average, 12 sperm candles is a very fair standard. I do not think it a high limit; I think it a fair average. The illuminating power differs a little, according to the time of year, and according to the temperature acting upon the mains; but the variation is between 13·68 sperm candles in the winter, and 12·11 sperm candles in the summer.

By the COMMITTEE: About a candle and a half between the two extremes.

By Mr. WEBSTER: As far as I know, the character of the gas produced from the different kinds of coal supports me in that opinion; but I would rather speak from facts coming under my own observation. I have made a great number of examinations of the gas supplied to the metropolis, and I think that it is an average of 12 sperm candles.

By the COMMITTEE: I am only speaking of the companies supplying the City; I think it is, upon the whole, very fair, and averages 12 sperm candles.

By Mr. WEBSTER: I have made a great many experiments upon coal gas, but I have never taken the trouble to investigate the origin of that gas. I have been called upon by town councils and others to make examinations, but I have never inquired what coal the gas came from. In a work which I published some time ago, I tabulated a great number of different kinds of gas. They were not the results of my own investigations but the reading of other practical men's inquiries. So far as I have formed an opinion from the experiments of other people, they confirm my view that 12 sperm candles is a very fair standard.

By the COMMITTEE: That is the average of the common gas of the metropolis.

By Mr. WEBSTER: I have found a difference between the gas of the Central Company in the City and without the City. It is two candles higher at their works than in the City; therefore, if it is to be 12 sperm candles, it ought to be sent out at 14 sperm candles; the illuminating power depends upon the place where the experiment is made. My experiments were taken at the point of consumption. It appeared to be so remarkable that the gas in the City should be 12, while at the works it was apparently 15, that it became a serious question with the contractor whether or not there was some error in my investigations, and therefore we appointed a meeting and had some of the best testers in the three places to examine the gas. The experiments were made upon Wednesday the 17th of February, 1858; they were made at the Bow Works, where the gas is manufactured, at my laboratory at the London Hospital, half-way between the works and the City; and they were made in the City. I may mention the names of the experimenters, and you will see that the experiments were made by men able to judge of the results. They were the late Mr. Wright, Mr. Warington, the chemist of Apothecaries' Hall, Mr Keats the chemist of the City of London Gas Company, Mr. Geisbers, the manager at the Bow Works, Mr. Harris a gentleman who worked with Mr. Wright in all his investigations, my assistant Mr. Rumball, and myself. We worked in pairs, one gentleman being appointed at each place of experiments. The result was this, that at the Bow Works we found that the mean illuminating power was 14·13 of sperm candle of 120 grains; at the London Hospital, 12·19; at the City, 12·12; so that the great deterioration had taken place before the gas got into the London Hospital, after which there was very little loss.

By the COMMITTEE: It is a little longer from the Bow works to the London Hospital, than from the hospital to the City; but, taking the course of the gas in its passage, the probability is, that the actual distance is greater between the London Hospital and the City, than between the works and the London Hospital, because, between the works and the London Hospital it is a straight run of main.

By Mr. WEBSTER: My view of the reason of the great deterioration in the first half of the distance is this—The illuminating power of coal gas is dependant upon compounds called hydro-carbons, which are liable to condensation by cold. In ordinary coal gas, they do not average above 5 per cent. of the gas. The rest is gas, of no illuminating power at all, scarcely; and in the passage of the gas along a pipe liable to the influence of the weather, the cold will cause a deposition of perhaps 1 per cent. of the hydro-carbon, and that will lower the gas two or three candles perhaps. We made experiments upon the pressure of the gas at the same time. We found that the mean pressure at the works during the evening was 3·6 inches of water—very nearly 3¾ inches. It kept steadily at that the whole time. We found, at the London Hospital, a pressure of 1·18, and we found, in the City, that it was a little higher—1·4. I can explain how that is; the pipe which runs between the London Hospital and my laboratory is a rather small one; and the probability is, that the consumption of the gas, besides the friction of the gas, had lowered the pressure there beyond its proper proportion; at any rate, this is the result—that, with a pressure of 3¾ inches of water at the works, you have not 1½ in the City; there is 1½ inch of pressure lost between one and the other.

By the COMMITTEE: My laboratory at the London Hospital is about seventy or eighty yards from the main.

By Mr. WEBSTER: The distance of the works from the City, is, I think, three miles. It is rather an unusual case. I made some experiments in Marylebone in 1855. In the course of those experiments, I found there was a considerable variation at times in the illuminating power of the gas. I think, if the gas companies carry out the districting arrangements, there is a necessity for a supervision, in order to ensure the present average of an illuminating power of 12 sperm candles in the metropolis. It is a sort of logical conclusion that the public should be protected in regard to the illuminating power. One of the causes of a low illuminating power is the presence of atmospheric air in the gas. Another cause is the circumstance of the gas being made at a higher heat than usual. This also leads to the presence of impurities. These irregularities in the illuminating power are due to imperfections in the mode of manufacture; and they are not only disadvantageous to the public on that account, but on account of introducing matters which are injurious. The gas of the Great Central Company is very free from sulphuretted hydrogen, and from ammonia. It does not contain more than five grains of ammonia in 100 cubic feet. If proper precautions are taken, there is no difficulty in supplying gas free from these impurities. The gas of the metropolis is now very free from them; it was not so a few years ago. There ought to be a guarantee to the public that the gas should be free from them, and I can see no objection to the companies being required to do it.

By the COMMITTEE: The bi-sulphide of carbon undergoes great variations; it is generally found in the gas. The ammonia can no doubt be entirely taken out; but I do not think it advantageous to remove the whole of it. It is a balance of difficulties, and I think it would be a greater disadvantage to the public to have no ammonia in coal gas, than to have a little. There should not be above five grains in 100 cubic feet. With reference to the bi-sulphide of carbon, I have made a large number of experiments, and I think there ought never to be more than twenty grains of sulphur, in any shape whatever, in 100 cubic feet. I think it can be brought down to that without any unreasonable expense, and the companies would find it to their advantage to reduce it even below that. If the question arises about the production of a large quantity of cheap gas, there may be a temptation on the part of the company to manufacture gas at a very high temperature, and that would produce greater impurities.

By Mr. WEBSTER: The presence of those impurities is not so much due to the coal as to the want of proper precautions in the manufacture. When in the gas, I do not know any means of getting them out; they must be prevented getting in. The last contract of the Great Central Gas Company with their contractors was, that there should not be more than five grains of ammonia, or twenty grains of sulphur, in any form in 100 cubic feet of gas, and that there should be no trace of sulphuretted hydrogen, and they kept to the contract. The sulphuretted hydrogen should be excluded absolutely, and it is to the interest of the companies to exclude it. It destroys the binding of books, &c. I remember, in a case which occurred at Chatham, several houses were ripped up on the supposition that there was something wrong with the drains, whereas it was entirely owing to the sulphuretted hydrogen in the gas. As regards ammonia, there may be a small quantity without detriment; and, with regard to the bi-sulphide of carbon, it ought to be understood, that if in the progress of science means are invented for getting rid of it, those means should be adopted.

By the COMMITTEE: I am of opinion that great injury arises to the soil from the leakage of the gas-pipes. I have recently reported on the subject in consequence of the experiments of Mr. Spencer, which he has published in a pamphlet. I have already reported that it does great mischief to the soil. I believe that improvements in the joints of the pipes, by which this leakage can be prevented, is actually in operation; that a plan is adopted in some of the large towns of grinding one pipe into another. I agree thus far in the statements of Mr. Spencer, that there is no doubt the escape of gas into the street produces that black and fœtid condition of the earth, and there is no doubt that it injures the water-mains. I have not gone so far as to speak positively as as to whether it decomposes the sulphates contained in the earth. I do not think that it has anything to do with the impurities of the Thames, so far as my inquiries have gone.

By Mr. WEBSTER: There can be no question that the fœtid state of the soil of London is due in a great measure to the escape of gas from the pipes, and that it is a detriment to the water-pipes as well as to the soil. The results I have given, as to the illuminating power of the gas supplied to the metropolis, refers to common gas. I have made experiments upon the cannel gas of the City Company. I examined it at the *Times* office every night for three months in 1854. I found the illuminating power was only 13·7 sperm and 15·6 wax candles. It was very low cannel gas at that time; I could burn it from a five-feet burner, which you cannot do with cannel gas generally.

The CHAIRMAN: Do you think that you can draw any conclusion for the present time from the experiments which you made in 1854?

Witness: Only in this way, that that should be the minimum quality for cannel coal gas.

By Mr. WEBSTER: The cannel gas is now about 20 to 24 candles. I made at that time (1854) an examination of six kinds of gas over a period of three months, and there was not one below 12 sperm candles; all were above it; the lowest illuminating power was 12·2 sperm candles.

By the COMMITTEE: The variation with common gas between 1854 and 1859 has not been so great as with cannel gas; it has kept nearly the same, about 12 sperm candles.

By Mr. WEBSTER: In the course of my experiments, I found that the pressure of the gas at different parts of the mains was very different. The Great Central gas is never below an inch pressure at the mains. In my experiments in 1854, I found a considerable variation. There was a variation from two inches and two-tenths to two-tenths; the lowest pressure was with the cannel coal gas; the average pressure was only three-tenths at the *Times* office, but that was after it had passed through a Leslie's governor which had been placed there. A Leslie's governor was put up at the *Times* office in order to equalize the pressure at all the burners throughout the office. If there is a diminution of pressure, the consumer suffers very much from want of gas. I work a great deal at night, and the gas supplied to me falls off in the middle of the night. It is of importance to the consumer that the pressure should be kept as nearly uniform as possible. I am aware of the provision in this bill that the pressure should be an inch at all times. That is a good working pressure. It is the pressure of the Great Central Company, except at certain times in the evening.

The CHAIRMAN: Are you of opinion that, in order to keep up a regular and uniform pressure, there should be, in fact, at certain periods of the twenty-four hours, a diminution in the rate of pressure, and at others an increase? Yes, that is a matter which should rest entirely with the companies, who are better managers of their works than I can pretend to be; but as the consumer gets it, there should be an inch pressure. I should say the pressure should not be less than an inch.

By Mr. WEBSTER: I would regulate it at the public lamps. I would make that the standard, and I would not have it less than an inch.

By the COMMITTEE: A very large pressure wastes the gas, and is inconvenient to the public. It causes a flaring of the light, and smokes the ceilings, and is as great an inconvenience as a low pressure.

By Mr. WEBSTER: I do not think it is of importance to the public at present, that there should be an inch pressure in the day time as well as in the night, because there is not much consumption of gas in the day. I think that it would be rather unfair to the companies to compel them to supply an inch pressure at day, because the leakage from the pipes must go on without any corresponding benefit. The consumption by day is in cooking processes.

The CHAIRMAN: Have you any suggestion to make as to what would be an amount of pressure in the day time sufficient for consumers, and fair towards the companies?

Witness: It should never be less than half an inch in the day. I use gas in my laboratory during the day, and I find that pressure sufficient. It is sufficient for most cooking purposes. The drain is so small by day, that a little pressure will keep up the supply pretty well.

By Mr. WEBSTER: The pressure in the pipes of the Great Central Company during the day has averaged about an inch, but lately it has been about 7-10ths. Half an hour before lighting up, it is from 2 to 2½ inches.

By the COMMITTEE: I would suggest that the companies should be obliged to furnish, by day, a pressure equal to half an inch; and that, by night, the pressure should be a minimum of one inch. I would not suggest that any maximum should be fixed; I think that the gas companies would protect themselves.

Cross-examined by Mr. BURKE: No doubt the gas companies endeavour to regulate their manufacture and supply so as to meet the wants of their customers. It is reasonable that they should regulate their day supply, so that they should have gas enough for the evening. I quite agree with you that the regularity with which London is now lighted, at the time when the light is wanted, is almost wonderful. The accuracy and sufficiency of the supply is the result of the unrestricted action of the gas companies. I do not want anything better. It is all right up to a certain time in the night. The complaints have been after a certain hour in the night. No doubt, while the profitable consumption is going on—while the shops are demanding gas—it is to the interest of the companies to give a proper supply. I want, at the public lamps, a pressure of an inch. If there is a "considerable pressure" at the time when there is no demand, it would be unfair to the companies, by causing a large amount of leakage. That would apply to the day time; there is no necessity for great pressure then, because the public do not require it. The greater the pressure, when there is no supply, the greater the escape, and, consequently, the greater evil in a sanitary point of view. We want to guard against that by an alteration in the disposition of the pipes. I do not want all the pipes in London taken up; but I think it would be advantageous that all pipes laid for the future should be laid with turned and bored joints. I cannot tell whether it would be mad to propose that all the pipes in the metropolis should be taken up and relaid. It would be to the interest of the gas companies to look to that. If the gas companies were called upon to furnish

an inch pressure, and they found the leakage unprofitable to them, it would be then for their advantage to consider whether they could adopt means of stopping the leakage, and whether it would be better to relay the pipes. I have never considered the question of the expenditure of capital that would be necessary to take up all the present mains, and replace them; all those matters balance themselves.

Mr. BURKE: You answer in this way: the public require gas at an inch pressure at night; if the gas companies find that there is a leakage at that pressure, ultimately they will consider the question whether it will not be better for them to replace the old pipes by good pipes; will not that require a totally new description of pipe?

Witness: Yes. The pipe could be laid with great facility, and with less cost to the gas companies, than the present pipe. The old pipes are disposed of now by the companies, in some way or other; they must do the same thing. I have not admitted the necessity for taking up the whole of the mains. I have said nothing about such a thing. I have admitted that the health of London is affected by the fact of escapes of gas from the present construction of the mains, and that that effect would be increased, if increased pressure is put on. There is no remedy for that escape but taking up the pipes; but I have not the remotest idea what the cost to the companies would be in doing that. I have never heard that the Phœnix Company tried the new pipes, and were obliged to abandon them, because the escapes were greater than before. No doubt increased pressure would increase the leakage, and entail considerable loss upon the companies. I think the question, looked at from all points of view, resolves itself into this—whether, or not, the public lamps ought to be well supplied with gas at night. The other questions, though you may consider them of great importance, are, to my mind, of very minor importance, in comparison with that question of public safety. I have known the public safety endangered by the absence of light in the public lamps. I was called upon to make an examination of the gas in the neighbourhood of St. John's Wood, by reason of the circumstance that the public safety was endangered on account of the bad lights there. It was in November, 1855, that I was called on by the parish authorities to examine the gas supplied in the whole district of St. Marylebone. My report upon the subject is printed. I cannot call to mind what the illuminating power of the gas was. I know they were batswing burners that were employed at that time. I do not know that the vestry of St. Marylebone refused to pay for the ordinary batswing burner at St. John's Wood, and required a less burner than the other parishes, consuming only four feet an hour instead of five. This is the first time it has been mentioned to me. The pressure of the gas diminishes from various causes—from condensation in the pipes, and from the distance travelled.

Mr. BURKE: So that, if the company's mains extended a long distance, and they had to supply various small streets with small mains—if it be true that the pressure diminishes by distance and by obstruction, it would require an enormous pressure, would it not, at the works, to meet the diminishing pressure at the end of the work?

Witness: I will answer the question by an actual fact. The pressure at the Bow works is 3·6 inches, and the mean throughout the City is 1·43. The variation in the pressure in the City was none, scarcely; 3·6 was the maximum and the minimum at the works. The variation in the City is 1·5 the maximum, and 1·4 the minimum; 1·43 being the mean. The gas is carried through a long main and a ramification of pipes; it is exactly the condition you put to me.

Mr. BURKE: Is the condition of things, as regards the diminution of pressure, the same whether the distance the gas goes is three miles, or six?

Witness: I cannot tell you; that is an engineering question. We are there three miles off the City; we have a most extensive ramification of mains in the City; and there is the fact, that the pressure is 3·6 at the works, and there was no variation at all in the City beyond a tenth. No doubt the pressure would diminish if the main were laid from London to York. The Bow works are an exception to the general rule, for gas companies generally supply in their own neighbourhood. It is quite possible that some companies in London supply consumers more than six miles from their works.

Mr. BURKE: Will you undertake to state that the pressure will not go on diminishing to a greater extent at the end of six miles than at the end of three?

Witness: I have to look at it from two points of view. Experiments have been made by Professor Graham, which have been laid before the Royal Society, upon the distribution of gas, and he lays it down as a law that, after a certain distance travelled, no further diminution of pressure takes place.

Mr. BURKE: Is there, then, a standard point, at which the pressure ceases?

Witness: Yes; the standard point with him, I think, was this—he has given a formula for it—the relation is between the diameter of the pipe and the length traversed. I am speaking from memory, but I think he puts it in this way—that, when the gas traversed a length 4000 times the diameter of the pipe, it had got its maximum of friction. After it had passed a certain length of pipe, in accordance with the diameter, then, after that, as far as experiments went, he discovered no difference in the friction of the gas. You ask me whether the friction would not go on increasing if a pipe were laid from London to York. I say, there comes a time when the friction has been exhausted.

Mr. BURKE: You say a point arises at which the friction has no further influence; if you extend the pipe beyond that point, must there not be friction in the passage of the gas, and does not that diminish the pressure?

Witness: I should think so, certainly.

Mr. BURKE: Then, how do you account for the uniformity of pressure throughout?—how is it possible that there should be any point at which the diminution of pressure ceases?

Witness: I do not understand the bearing of your question. My opinion is, that a gas company should not supply anywhere in their district gas at a less pressure than one inch. I do not go into the question at all as to the pressure required at the works to produce that. I know, as a matter of fact, from investigation and from my own experience, that one inch of pressure is supplied to the City by a company, and very advantageously. I think the pressure should be taken on the main. If the light is out, and the pressure-gauge is put on the burner at the end of a long service-pipe, the pressure will be exactly the same. The friction through the narrow service-pipe will not diminish the pressure a bit. I found the pressure at the *Times* office to be 3-10ths upon the average, after passing through Leslie's governor. They regulated their governor to supply the whole of the establishment at an uniform pressure of 4-10ths at the governor.

Mr. BURKE: I suppose the *Times* newspaper office require as good a supply as most other establishments?

Witness: Certainly; at that time there were two or three conditions of things that rendered the case quite exceptional. In the first place, they were burning cannel gas, not the common gas; in the second place, they were burning it with Leslie's burners, which are not the common burners in the metropolis; and, in the third place, as the compositors were standing in their desks, they required a light of one constant and uniform intensity; and, therefore, to get those three exceptional conditions, they had Leslie's burners, and they regulated the supply so that those burners should not require any touching, but that they should always burn the same quantity. That quantity was five cubic feet per hour. I did not ascertain the price they paid for gas.

By the COMMITTEE: I cannot answer the question, what is the extreme distance of the consumption in the City from the works at Bow. With regard to the purity of gas, it does not appear to me to be practicable to extract any of the bi-sulphide of carbon from it. My answer was this—that if the bi-sulphide of carbon is not to be in the gas, it must not be put there; the gas must not be manufactured at too high a temperature. If it is in the gas, there are no means of getting it out at all. I have reason to believe, from experiments which I have made, that the bi-sulphide of carbon is caused by the gas being made at a high temperature. I think I reported to the corporation upon that.

By Mr. BURKE: I do not say that there are no other causes of its creation than that. The quality of the coal, to a certain extent, may effect it. It cannot be taken out, but it need not be produced from any quality of coal, except at high heats. If there is a maximum of 5-10ths per cent. of sulphur in the coal, the highest temperature cannot get that out; but, if you have a coal containing more sulphur, with a higher temperature, we get out so much more. Different descriptions of coal contain more or less sulphur. They range from the 700th part of a grain, to four grains in 100lbs.

Mr. BURKE: Supposing two different coals to contain two different quantities of sulphur, could they be worked at one and the same heat without producing a different amount of bi-sulphide of carbon?

Witness: If you go to the objectionable process of making gas at a high temperature, then the quantity of bi-sulphide of carbon evolved would depend upon the quality of the coal. I would not vary the temperature at which gas was manufactured according to the assumed quantity of sulphur in the coal. If you go beyond the proper heat, it is all dependent upon that whether you have bi-sulphide of carbon in the gas or not.

By the COMMITTEE: I think there is no doubt the gas companies could always find out what the proper heat should be. I have myself made gas without a trace of sulphuret of carbon in it.

By Mr. BURKE: I have never been practically engaged in the manufacture of gas. I could define the heat at which gas should be made. I know that lately clay retorts have been used in some places in preference to iron. I will not speak upon the subject of whether they have been found to be more beneficial. I dare say they have been found to evolve a greater amount of heat in making the gas than the iron retorts; they are bad conductors of heat. At the present time, sulphuret of carbon is always found in coal gas. I should think it would be unfair to impose a penalty upon companies if there were any bi-sulphide of carbon found in it. With reference to ammonia, the gas has very little in it. As far as my knowledge goes, it does not have any effect upon the lighting power of the gas. It damages all the copper-fittings, and produces sulphate of copper. This is sulphate of copper which has been produced by gas. [Producing two samples.] The gas supplied to the metropolis is absolutely free from sulphuretted hydrogen. I should be sorry to get rid of the ammonia altogether.

Mr. BURKE: You would think that a provision of the bill, which required that the ammonia should be got rid of, would be a mistake?

Witness: I think there would be a disadvantage in that. We should have hydro-carbons deposited in the pipes, which would be a more serious inconvenience to the public. I think that the gas which is now supplied to London is very good in that respect. There is a variation in the different companies, but taking the average, it is pretty good. The illuminating power varies according to distance; so that on a long length of pipe, the illuminating power would be less than at the works. I have told you the actual result of my experiments. At the works, three miles off, it was 14 candles, whilst in the City it was 12. It is not altogether subject to the same rule as applies to pressure. There is a standard point at which the illuminating power does not diminish. When the gas has to go for a long distance in cold weather, through pipes subjected to the cold, the illuminating power of the gas would not go on diminishing the further the gas travelled for ever and ever. I have myself passed gas through a freezing mixture. The lowest I have got after passing it through a freezing mixture and testing it by bromine was three of condensible hydro-carbon. Over a range of eight years, with cold and every influence acting upon the gas, we have found that in the City it has been equal to 12 candles; the average is 12·11. I will not say in all parts of the City. That is not the minimum illuminating power, for I see this, that on the very night we made the examinations together at the works, at the hospital, and in Coleman Street, the lowest illuminating power in the City was 11·89. That was the least. It is only 11-100ths of a candle under 12. That was a cold night; the temperature was 30°, and had been so for a month. If the company had been obliged by Act of Parliament to supply a light of 12 sperm, instead of 12 wax candles, I suppose they would have been liable to a penalty. They are required to give a light of 12 wax candles. I have made experiments on gas when the thermometer has been at zero. I have mixed snow and salt, and passed gas through it. That was a very severe test. If a company were required to give a certain standard of illuminating power, they would have to work about two candles above that standard so as to avoid the penalty. At the present moment, the gas companies are under no penalties as I understand; but in the City and everywhere throughout the metropolis, without there being any penalty, the mere compulsion of competition leads to this, that they are furnishing the public with a light of 12 sperm candles.

Mr. BURKE: Have you made any report upon a much less illuminating power than that as being furnished by the Great Central Gas Company's while Mr. Prior was lessee of the works?

Witness: I do not remember. There were irregularities during Mr. Prior's working; but my impression was that the irregularities were the ranging between very high and very low. I cannot tell you what the high and low were. I have no recollection of having reported on a particular occasion that it was very much below 12 wax candles. I do not think that I reported when it was in the hands of Mr. Prior, that the gas was no more than 7 candles.

Mr. BURKE: Will you undertake to say when you were officially employed by the City to test the gas of the Great Central Company, you did not report at that time that the gas was very much under 12 wax, instead of over 12 sperm candles?

Mr. DENISON submitted that the report should be produced.

Witness: I remember this: when Mr. Prior was engaged at the works, the gas was subject to great variation—sometimes rising to 18 or 19 sperm candles, and then falling to 11—which gave rise to a great deal of dissatisfaction; but I cannot remember what the lowest was.

By the COMMITTEE: The illuminating power of the gas depends upon the heat at which it is produced. A high heat does not produce a high illuminating power, but the reverse.

By Mr. BURKE: I have not made any experiments to ascertain the illumi-

nating power which is afforded by different descriptions of coal, except that I have examined the gas of different companies, where they have been working with different descriptions of coal; but I have never made it the subject of inquiry. I cannot say whether any company in London produces the present illuminating power without using cannel coal. The use of cannel coal would affect the cost of manufacture; but they do not want it for ordinary gas, unless they have a high temperature; then they have a great bulk of weak gas, and it is worth their while to get it up with cannel. I know that Boghead coal is at a very high price, and that that price has largely increased.

Mr. BURKE: Do you think it is a fair thing to put the maximum price upon gas at only just what the companies can make a present dividend by?

Witness: I have always said that it appeared to me improper to fix a maximum price, without regard to the price of coals. There should be a relation between the cost of the raw material and the manufactured article. I know no more of the affairs of the Great Central Company than you do, and not so much. I was a witness last year against the City Gas Company. I do not think that, on that occasion, I was asked a question about the illuminating power. I do not know that the maximum then fixed by the committee of both Houses of Parliament was 5*s*. I advised the corporation to oppose the City Gas Company having their works continued in the City. The corporation were petitioners against their bill, acting upon my advice as medical officer for the City of London.

Re-examined by Mr. DENISON: I was not advising them upon the question of price, but rather upon the question of getting rid of the works altogether from the City. There was then, as now, great competition in the City. There are three companies there, and the Commercial Gas Company, which supplies a little bit of the City, makes a fourth. Where there is competition, it does not appear to be of much consequence to have a limitation of maximum price. I have not gone into the question of the state of the joints. It is an engineering question, how far a saving would be effected by laying down pipes with the new joints.

By the COMMITTEE: The leakage does not affect the pressure at all. I am informed that in some of the large towns they actually use those pipes, and that it has been to the advantage of those who supply the gas to take up the old ones and lay down the new. They have found that not only is there a reduction in the leakage of about 9 per cent., but they also have found that it has completely prevented the sub-soil of the earth from being affected in the manner in which it is in London. The leakage from all the companies amounts to £43,000 a year, and it is a serious question whether or not it would be worth their while to take up the old pipes and lay down new ones. No doubt, the constant leakage of 20 per cent. does diminish the pressure.

By Mr. DENISON: It is quite new to me about the Phœnix Company trying the new mains. It is necessary that experiments of that kind should be done well. Sometimes, experiments are made with no very great desire that they should succeed. The theory about the variation of pressure reaching a maximum at a certain point, is Professor Graham's. I do not propound a theory, but state, as a fact, that I found it from 3·6 down to 1·5; there is that variation corresponding to three miles, and then there is no more. Whether the pressure at the main is greater than that at the burner, depends upon whether the burner is burning or not. In the case of the *Times'* office, the pressures given in my pamphlet are the pressures when burning. I should think they would correspond to about an inch at the main. The governor does reduce the pressure somewhat; it was put to equalize the pressure throughout. I would not put any provision in the bill respecting the ammonia, except that it should not exceed 5 grains in 100 feet, because after that it begins to act upon the copper and brass-fittings. Whatever the illuminating power is fixed at, the companies must work to two candles beyond. Twelve sperm candles should be the minimum; many of the companies do give more habitually. The Central Company find it to their advantage to do so, and they work it easily. It appears to me to be fair that there should be some relation between the price of coal and the price of gas. If it could be arranged, there should be a fall in the price of gas when there is a fall in the price of coal. It would not be fair to fix a maximum price for gas, having reference to the probable price of coal. The price of coal is dependent upon a variety of circumstances, over which the gas companies have no control; and it would be a serious thing to fix a price now, in relation to the price of coal, when coal might become very much dearer from a variety of causes. If it is to be done at all, it should be done somewhat in the same way as in the Sheffield Act, by a sliding scale.

Mr. *William Crosley*, examined by Mr. DENISON.

I am a meter maker, and was employed by both Mr. Brunel and Mr. Stephenson for several years. The Mr. Crosley who has been mentioned here was a relation of mine. I did not succeed to his business. The Gas Act of last year goes a long way towards remedying the evil that existed at that time, in reference to the registration of meters, but it is not perfect. The matter, I think, requires further legislation. I think it is necessary, in the first place, in reference to the testing of meters. The Act is not complete as it stands at the present time; it does not detect the errors which exist in dry gas-meters, especially under all circumstances. For instance, a dry gas-meter, travelling at one speed and travelling at another speed, does not give the same results. I think, with regard to wet meters, there is an awkwardness in the different construction of meters. Some are more easy to be submitted to the test than others, and I think there should be some provision introduced to render them all equally convenient for being tested.

By the COMMITTEE: I would accomplish that by requiring that the tests should be all uniform. I will give you an instance:—You may test some wet meters by the measuring-wheel, which is the most accurate mode of testing gas-meters. Others, again, are so constructed, that you cannot see the wheel, and you must necessarily, in that case, test them by what is called the index-drum, which is the small wheel above the index. But there you only get a very small circumference of a minute wheel to represent, in many cases, five cubic feet, whereas you may get many hundreds of inches lineal to represent the same quantity by the measuring-wheel. I think an opportunity should be given for testing all wet meters by the measuring-wheel, and that it should be required that all meters be made so as to be capable of being tested in that way.

By Mr. DENISON: There are many modifications of wet meters. They are divided into classes—viz., the high-spouted ordinary wet meters, and low-spouted. There are also compensating meters. It would be possible to have the same principle applied to all of them as to testing. Those modifications do not affect the principle of the testing. If the meter is too full of water, the effect is to make it register against the consumer. There is a way of preventing that. I would suggest that all wet meters should be so constructed as not to be capable of holding water above the proper water-level of the meter. That might be managed by means of an overflow-pipe of some kind, which should carry off the surplus water into a lower chamber. There are a great many meters which preserve the water at an even height, and those are the kinds which I think ought to be adopted. The meters are very much under the management of the gas companies. As a general rule, the companies provide the meters; there are, of course, exceptions to the rule, but they are comparatively few, taking the country at large. I have examined and tested meters myself, and have very often found instances in which the water-line has stood a great deal too high. I have found meters overcharged with water at various ranges and to various extents; in one case, I found the water up so high as to produce an error of 63 per cent.

By the COMMITTEE: I did not ask, in that case, how long it was since the inspector had filled the meter.

By Mr. DENISON: I have very often observed the water-line too high when the meters have come to me for repair; but I have also another mode of testing meters when actually at work. I think I gave evidence on the former occasion that in Manchester I found one meter over-registering 35 per cent., and found others of various ranges up to that point. Speaking from my own experience, I should say that the companies take care that the water shall stand high enough. My remark applies to meters of certain constructions; there are some meters so constructed that they cannot be filled beyond the proper point.

By the COMMITTEE: Some companies use the meters which cannot be overfilled, and I believe supply them to their consumers, but I am not quite prepared to say which.

By Mr. DENISON: It depends upon the locality; in some localities, you find the high-spouted meters prevail; in other localities, the low-spouted prevail. The high-spouted register mostly in favour of the companies. I have four meters at my works supplied by the Phœnix Company, and I have also one at my house, where the gas is supplied by the Imperial Company, but I am obliged to find that one myself, as they would not supply me with one. At the time I became a consumer on the Imperial main, there was an opposition in some parts of their district. There I understand they did provide meters, but where there was no opposition, as in my case, they would not provide the meter, and I had to provide it myself. It is a wet meter, on what is termed the high-spout principle. I make meters myself on the low spout principle. I have made a very few on the high-spout principle, but not lately. The meters which I make are what are termed compensating meters. The object of the compensating meter is to compensate for the evaporation which goes on in what is termed the ordinary meter. Of course, a current of gas passing through a wet meter would cause a small portion of the water to evaporate with the dry gas, and in course of time the water-level would be reduced; the object of this compensating principle is to maintain that water-level at its proper point, so as to keep the meter accurate and uniform in its registration. When meters get out of repair, the general rule is to charge the consumer's gas by the charge for the previous corresponding quarter's charge. That appears to be the right thing at the first glance, but I do not think that that ought to be taken as an absolute rule, because, in one case, a family might be at home the whole of one quarter, and during the corresponding quarter of another year they might not; but, if at home in one case, they might consume a large quantity, and, in another a very small quantity; therefore, I think it should be inquired into, but of course at the first glance it appears to be right, and if the circumstances are equal, it is quite equitable.

By the COMMITTEE: The exact way in which the charge is made is this: Supposing I burned 5000 feet of gas during the quarter ending March, 1858, and during the quarter ending March, 1859, my meter ceased registering, being out of order, the company would not take the registration of the meter, but would say, "You burned 5000 feet during the corresponding quarter in the preceding year, and we will charge the same quantity this year." At the first glance that appears reasonable, and if the circumstances are the same in both years, it is so, but not otherwise.

By Mr. DENISON: Practically, the companies make themselves the judges whether the meter is out of repair or not. I know a case where the consumer was absent some time, and his bill was actually larger when away from home with his family than when he was at home with his family. In a case of that kind, you could scarcely take the corresponding quarter. I do not know whether the Imperial Company impose a limitation upon the number of makers whose meters they allow to be used. They limit it to the extent that they do not admit me; whether they object to any one else or not, I do not know.

By the COMMITTEE: They admitted just one meter from me on one occasion previously. I had submitted a meter to them. It was about the time the patent meter came out, and I understood from the directors that, if I would submit a meter to each of their three engineers, and, if their engineers approved of it, they would allow it to be fixed; in fact, I had a particular case where I wanted to have it put up at the time, I submitted the meter to the engineers as desired; and, as far as I could gather, they approved of it. I then sought a second interview with the directors, and they appeared to be satisfied; but they then told me that it must be submitted for three months longer within their works. At that time, it was practically, of course, amounting to shutting out the meter, because it was so late in the season, and the person wanting the meter must have it immediately, or not at all.

By Mr. DENISON: The result is, that my meter is not used by the Imperial Company. In some cases, it is largely used by the public. It was a compensating meter which I proposed to the Imperial Company to use. That is a meter which gives security to the companies by providing against evaporation; that was the object of the patent. On the other hand, it also provides against the water standing too high. No other reason was given for their declining to use it, except that it must be submitted for three months longer trial. I think this happened in 1856. In my former evidence, I referred to a lady who consulted me, and who wished to have a meter different to the one she was using. It was an ordinary wet meter, capable of being overfilled, and she was dissatisfied with it. I advised her to have it changed, and she wished to have one of mine, but the Imperial Company would not allow it, and I advised her, therefore, to have another, which she did. That was about the same time as the circumstance I have been speaking of between me and the company. There were two meters in question; one was for a stable I have in Westbourne Park, and another for a house in Westbourne Terrace, and there was a difficulty about each of them. In my own case, the company lent me a meter for three months, and, until I had that, I could not be supplied with gas. One of my meters was fixed after theirs, but not as the official meter for the purpose of registration the company would not go by it.

By the COMMITTEE: I have not looked lately to see whether the meters agree or not. The stable is not in my own occupation.

By Mr. DENISON: The expense of repairing a meter, when out of order, depends upon an arrangement between the consumer and the company; in some cases, the consumer—and in others, the company pays. There has been a difference between the companies as to the standard measure of a cubic foot of gas; the meters and gasholders made by different manufacturers were not alike. I do not know whether there is a difference between Manchester and Liverpool now; there used to be. I gave evidence in 1858 upon this point. The Manchester measure was then, I thought, too small.

By the COMMITTEE: The Sale of Gas Act requires that the same standard shall be used throughout Great Britain. The want of uniformity has not been rectified at present, because the Act has not come into operation. There

will be an uniform measure of a cubic foot all over the kingdom if it ever does come into operation; but it was to have done so within three months after passing. When it will come into operation I do not know, because they have not yet lodged the standard models at the Exchequer.

By Mr. DENISON: If the Act had been carried out as required, it would have remedied some of the evils, though I am not prepared to say that it would have remedied them all. Dry meters are used to a considerable extent in some places. The wet meter is the safer registering instrument of the two, provided you could keep the water-line uniform. The object of my contrivance is to do that; but there are many others who aim at the same thing by other means. There are ways by which dry meters register wrongly. To give a popular description of the action of a dry meter, I may compare it to a pair of bellows. If you open the bellows to a certain extent, the chamber will contain a certain quantity of air; if you open it to a further extent, it will contain more air; and the accuracy of the registration of the dry meter depends upon the extent to which the chamber and the diaphragm are opened. It is also liable to variation from contraction of the leather the other way; also from leakage in the valves, and various other causes. Whether such failures as occur in dry meters have the effect of registering against the company or the consumer, depends upon circumstances. If the diaphragm becomes rigid, it will register more than the quantity actually consumed; if the distension of the diaphragm be less, it will register less than the quantity consumed. I find that practically the speed of the dry meter has a good deal to do with its registration. Supposing there is no leakage through the meter at all, and it is perfectly sound in all other respects, if it travels at a slow rate it registers more than the quantity of gas consumed. If there is a leakage, the quantity of gas that leaks through will not be registered. As to the supply of meters, I think the companies should supply them at a rental if required, or their price of charge should be such as to include that which would cover the rental.

By the COMMITTEE: In all cases of supply to private consumers, there ought to be a meter provided by the company; whether paid for in the shape of rental, or in increased price for gas, I think is immaterial. The companies invest so much capital in the meter, and they must have interest upon that capital. They must increase the price of gas, if they do not get a separate rental.

By Mr. DENISON: I think it is very important that the gas companies should, in all cases where required, supply meters; and, in giving that evidence, decidedly I am giving it, as I think, against my own interests, when I feel that, in some cases, the companies would not admit my meter upon any terms; yet, upon principle, I think they should supply the meter, and my reasons are these: when you come to provincial towns and villages, if the consumers are obliged to buy their own meters, should they go out of repair, there is the difficulty of getting them repaired. To send a single meter from a country town or village up to London would be inconvenient; but, if the company supplied it at a rental, they could keep a sufficient number in stock, so as to be able promplty to replace the imperfect meter with a perfect one; and they could send a quantity of them to the manufactory to be altered. It is within my knowledge that one person's gas, at any rate, was cut off, because he refused to pay for a quantity which had not passed through the meter; but the meter was altered to make it register so. Dr. Perkins told me that that was his case. I only know what he told me; he handed the accounts to me.

Mr. BURKE submitted that Dr. Perkins had better be called to speak to this himself.

Examination continued: I have supplied meters on a large scale to several towns. I do not supply any of the London companies, except that now and then I am favoured with an order from the Phœnix, for one at a time. I supply chiefly in the provinces. I have not supplied any meters to the Commercial Company since I gave evidence before. I have made a great many experiments upon these subjects since 1858, with the object of ascertaining whether the registration of gas by meter is at all to be relied upon, as a general rule, throughout the country. I find that, according to the present system, it is not. Of course the Act of last year will work a radical alteration in a certain class of meters, if it does come into operation. It will not correct, or rather prevent, the evil, which will still exist in the dry meter in the way I have described. It applies, practically, to the wet meter only. I do not say that it is impossible to get a safe registration of gas under the present system; I say you cannot ensure it. I think that there should be some sufficient legislative enactments to ensure it, the same as there is for other weights and measures. All other commodities are weighed and measured by weights and measures comparable with a standard at the Exchequer; but, though gas-meters are as essentially measures as any other, yet up to this time there is no legal criterion whatever to check the measurement of gas by.

By the COMMITTEE: I would scarcely venture to give an opinion whether dry meters ought to be prohibited; I would rather that a general consultation were taken on that subject. I say that, if you can keep the water-line at its right level, the wet meter is more to be relied upon, because the dry meter will go out of adjustment of itself. I may give you a case in point: a dry meter was fixed some time ago; it had been at work for a considerable period; it bore the official stamp of the tester of the district; but, when I was called in to ascertain whether it was accurate or not, I placed a wet meter alongside it, and I found they did not at all agree, and the result was, that the same dry meter was returned back again to the official tester who had put his stamp and seal upon it previously as correct, and he declared it was not correct, and he destroyed his seal which he had previously put on, though no one had meddled with the meter in the meantime.

By Mr. DENISON: I have had very little experience in London as compared with the provinces, but I have tested meters made by makers who live in London, and who, of course, supply London companies when they can, and also provincial companies, and I have found as much variation between the meters made by one maker and another as about 6 per cent., at what is considered to be the regulated or adjusted water-line. There are some meters that are glazed, so that the action of them may be seen, but they are not meters for ordinary use; they are merely intended for models, or show-meters. I come here as a consumer of gas, and as a meter-maker. I feel an interest in this question as a consumer. I tell you candidly that I have a greater interest in it, as a manufacturer, to see that there should be accuracy in the registration, which is of far greater importance, I think, to the trade than the effects it would have upon me as an individual consumer. I do not represent my own meter as the only one which secures accuracy of registration. By the Act of last year, there are to be various offices throughout the kingdom, in municipal boroughs and county towns, where meters are to be stamped by proper inspectors. I recommended, in my evidence in 1858, that, if Parliament interfered, there should be a registration-office for meters, where they might be stamped by the proper authorities; and that would have a good effect in doing justice as between the producer and the consumer. I am of that opinion still. There are places in houses where meters ought not to be placed, and I often find them in a wrong place. They ought to be fixed in a position where the temperature is tolerably uniform, and where they are not liable to sustain any injury. They should be in a position where they can be conveniently referred to, and where they would be looked upon as valuable instruments, in the same way as a clock in a house is.

TUESDAY, MAY 22.

Mr. *William Crosley* recalled, and examined by Mr. DENISON.

I have brought to-day the fronts of some old meters, to illustrate the questions I was asked yesterday as to the water-line. I will explain the nature and construction of the ordinary high-spouted wet meter—the meter which, I believe, is more commonly in use than any other meter in Great Britain. [Witness described the principle of construction at some length.]

By the COMMITTEE: There is a slight difference between the pressure of the gas at the inlet and the outlet; but the pressure required to turn the meter is so trivial, as not to be worth taking into consideration. There are various reasons why the meter is allowed to be filled up with water to a higher point than it should be; those reasons are decidedly not for the benefit of the consumer. The effect, without reference to motives, is to prejudice the consumer to a serious extent. If the meter is filled with water to a higher level than it should stand at, a part of the chamber is occupied with water which otherwise should be filled with gas; and that occupation is a constant one, except as to the amount of evaporation going on while the meter is at work. On the other hand, supposing the meter is not overfilled at any time, the evaporation will lead to error against the company. The registration of the meter is the registration of the number of revolutions made by the wheel, whether the chambers are filled with gas or not. The loss to the consumer by the water standing too high depends upon the size of the meter, and it varies also in the same sized meters of different makers; there is no law upon the subject. I and others have made meters by which not only the danger of over-filling, but also the loss by evaporation, are obviated; but those meters are not so extensively employed as the others. It is evident, from the meters in use, that the companies prefer the high-spouted ones. Without attributing motives one way or the other, I can only suppose that the reason why meters were originally made with high spouts was, that they had not then thought how to remedy the evil. I do not know that they serve any practical purpose; and I can see no other reason for adopting that sort of meter than a sheer determination to stick to old principles. [Witness explained the mode of supplying water to the meter.] The consumer has access to the meter; but, as a general rule, I believe that it is an officer of the company who supplies water to it. The most common period for doing that is once in three months. I understand that some companies do it once in six weeks, or once a month; and, in some places, in Lancashire and Yorkshire, where they are very large manufactories, mills and so forth, I have heard that they do it once a week, because a mill has a very large consumption per night. The natural and ordinary evaporation would considerably alter the level of the water in the course of three months. That may be one reason why the person pouring in water would put it rather above the proper level, in order to compensate for the loss by evaporation. But I should say, if it is to be done, it should be done under the authority of Parliament, to limit what it should be. Practically, it is done by the Sale of Gas Act, which says, that the amount of variation from the truth against the consumer shall not exceed 2 per cent. No doubt it is to the interest of the gas companies to see that the water is kept up and properly charged to a certain point. With regard to the question of over-filling, that is another consideration. The interest of the consumer is, that the water should always be not above a certain point, and of the companies', that it should be above that point. To check errors of this kind, the spout should be exactly at the true level.

By Mr. DENISON: There are plenty of compensating meters which keep the water to its proper height. If the consumer, not understanding the subject, took upon himself to put water into his meter, and to take the screw out, he might very likely do mischief, and render himself liable to an action for having tampered with the meter, as the companies term it, though he might do it innocently.

By the COMMITTEE: I believe it is quite a common practice for consumers to think there is something amiss with the meter, and then to supply water to it themselves. Many are under the impression that it increases the illuminating power of the gas. [Witness explained the action of the plug at the bottom of the meter.]

By Mr. DENISON: The object which I had in bringing these fronts was, to show that my evidence does not rest upon mere assertion with reference to the standing of the water-line. I am prepared to prove that it is quite a common practice, and this is an example of one:—The chalk line represents the actual line at which the meter is regulated; the upper line represents the practical working of that meter.

By the COMMITTEE: The amount of loss to the consumer depends upon the size of the meter, and also upon the height to which the water is carried.

By Mr. DENISON: The line drawn on this diagram is the proper water-line. The section above that being the segment of a circle, of course the higher the water-line rises, the greater the proportion the consumer would lose. The proper place for the water-line is above the turning centre of the wheel; consequently, if it falls an inch below that, the gas company would not lose in the same proportion as they would gain by its rising an inch, because it is part of a circle: if it were a parallelogram, it would be the same above and below. I am not prepared to say what the exact distance would be, in order to compare one with the other. If the water were an inch above the proper level, the meter would register very much indeed against the consumer; but if the water sank an inch below that level, the proportionate loss to the company would not be so great; but the range of the float generally does not exceed half an inch below. All these meter fronts show, more or less, the same result as I have referred to. On one occasion, I examined 36 meters in Manchester, and found 24 registering against the consumer. That was in December, 1857. The per centages of variation were from 1 to 35. In June, 1858, I made some further experiments on wet meters made by London makers, who supply them to the London companies. I found the variation, in one case, between the water-line at the highest and lowest points at which it would work with three lights on, was 69·77 per cent.; in another case, the difference was 41·58 per cent.; the third was 21·85; the fourth was 18·52; the fifth was 19·46; and the sixth was 11·55. These meters were purchased from the makers of meters in London for the purpose of making these experiment upon them. I have made more examinations of this kind since 1858. I will give a case, which I think is deserving of some attention, which occurred since I gave evidence before the committee of the House of Commons in 1858. It was at the private residence of Mr. Jervoise Smith, a partner in the firm of Smith, Payne, and Co. I was asked to try a meter fixed on his premises, and I attempted to make an arrangement with the London Gas Company to do so with their concurrence, but they

declined to allow the experiment to be conducted by me; consequently, I had to call in the assistance of Mr. Mills, who is the inspector of meters on the south side of the river, to make an experiment on behalf of Mr. Smith, in the presence of an officer of the London Gas Company. Mr. Smith was under the impression that his meter did not register accurately; and I found that the water-line plug was destroyed. It was removed; there was nothing but a cork in the place of the plug, consequently the meter could not be tested at the water-line as it was adjusted by the manufacturer, there being at the time no such water-line; but Mr. Mills tested the meter by another meter on the spot, at the line it was then standing at; and, according to Mr. Mills's test, I believe he reported the meter as acting correctly; and the consequence was that Mr. Smith, acting on my advice, I believe, paid the account under protest. At any rate, there was a certificate given that that meter had been acting honestly towards both parties. I asked Mr. Mills to test this meter [producing a meter] in my presence, at the top of the spout-level, because meters are frequently working at that level; but he declined, stating that he dare not do so for fear of the London Gas Company being offended, and the consequence was that he refused; but after Mr. Mills had done with the meter, I then had this front taken off, to see whether the meter had been actually working at the proper level or not. In order to do that, I had to unsolder the meter; and by that means I discovered that the meter had been working in that state [exhibiting it to the committee]. The scratch lines represent the water-line of the meter, from which you see that Mr. Mills's report as to the satisfactory working of the meter is a total delusion.

By the COMMITTEE: The water-line should be where those faint scratches are. I should have advised Mr. Smith to contest the point, but for this reason: I was told that this meter was originally fixed on his premises during the time when the Imperial Gas Company supplied the district; but that, about eighteen months previously, the London Gas Company had taken charge of that district, and supplied the gas through this same meter; so that had Mr. Smith contested the question legally, no doubt he would have had to prove whether the false line was created by the Imperial Gas Company or by the London Gas Company. Therefore, I advised him—though I believed he must necessarily pay for more than he consumed—that it would lead to a legal quibble, as to whether the London Company or the Imperial Company had done it. This [producing a meter] has no plug at the side, but the spout takes the office of a plug, and prevents the meter from holding water at a level above the top of the spout; all excess would overflow there, and come into this lower reservoir. It would not be safe to have glass in the side of the meter.

By Mr. DENISON: I have been applied to very often to alter high-spouted into low-spout meters, and I have done it. I will give you another example. I advised Mr. Job, of Woolwich, in one case, to claim a rebate, after examining a meter and testing it. Mr. Mills again gave a certificate there, showing that, according the existing system of testing meters, the tester's certificate is rather a delusion than of practical service. He gave a similar certificate of accuracy, and yet I protested against that meter as being accurate at the levels at which the water-line had been working. I advised Mr. Job to claim a rebate from his account over the whole period during which the meter had been working, in order to test the question with the company, to see how they would recognize it. They agreed to his terms; and, as I gather from him by this letter, they allowed a rebate of £5. 4s. 8d., rather than go into a question with him upon the subject. There is another case which I should like to give, because it is on another class of meters; this is the case of a Mr. Cathie.

By Mr. BURKE: That was at Christmas, 1859, and it was on the mains of the Surrey Consumers' Gas Company. I may explain that the meter fixed in this case is a dry meter; and, according to the arrangement on the south side of the river, all meters, before they are fixed on the consumer's premises, must be submitted to the test of Mr. Mills, the official tester of the district.

By the COMMITTEE: Mr. Mills was nominated by Mr. Thwaites and somebody else, professedly on behalf of the consumers, but he is paid by the gas companies. I suppose he is dismissable by the gas companies, as he dare not act without their concurrence. This dry meter bears the official stamp and seal of Mr. Mills, the official tester of the district. Mr. Cathie wrote to me, asking me to look at the meter for him; and I placed a meter of my own construction alongside his meter for some time, to see whether I could rely upon it or not. The result was that, by my advice, he had it referred back again to Mr. Mills, the same person who had put his seal upon it on a former occasion, and he pronounced the meter (notwithstanding that it bore his seal of accuracy) to be then 3¾ per cent. against the consumer. I advised Mr. Cathie to write to the company, stating that he had found his meter was not accurate, notwithstanding that it was marked as such, and stating that, if they would make a reduction from his account of 3¾ per cent. during the whole period that he had been supplied with gas through the meter, he would then pay the balance of his account. Acting upon my advice, he did so. The Surrey Consumers' Company then sent him in a corrected invoice, making a deduction in these words:—"Creditor by meter 3¾ per cent. fast. Allow from June, 1858, 3¾ per cent. 435,200, £3. 13s. 6d.;" which was deducted from his account, showing the little amount of confidence and faith they placed upon the stamp of the official tester of the district. Notwithstanding this, I believe that Mr. Mills, the official tester, performs his duties with as much integrity, straightforwardness, and uprightness as any man can do; but his duties, apparently, are to test meters at certain points and under certain circumstances; and otherwise he dare not test them. For instance, a dry meter he tests, as I understand him, with the number of lights burning at the time, that the meter is marked for. Suppose that it is a 5-light meter under test, he would put on five argand burners, and test it with those burners lighted. The result would be, that he would arrive at his conclusion from it; but if he had to test with only one light instead of five, or with ten lights instead of five, he would find the result totally different. The consumer cannot be bound to limit the demand upon it practically to five burners, on purpose to work at the only speed at which the meter would work accurately. That which vitiates his experiments in the case of the wet meter is what I have explained—the variation in the water-line; he does not try the meter at the top of the spout.

By Mr. BURKE: In the former instance I referred to it was a wet one. He does not test the wet meter at any other point than the point at which it ought to register correctly—not at the point at which it is found actually working, unless a dispute occurs, and then the meter is referred to him with the water as it is actually standing. Suppose a meter is sent to him to be tested, he would not think of resorting to any other test than that of testing at the proper water-line. Mr. Mills is the tester of meters for the south district. I do not understand him to be a public officer.

By the COMMITTEE: He does not interfere with the meter on the premises of the consumer, unless he is specially required to do so. If he is so required he tests the thing as he finds it. In the case I referred to, the meter as it stood at that time was no criterion of what it had been doing at other times. With regard to overfilling, the fault rests with the person who fills it. With regard to the water getting below the line, he may neglect to put in sufficient water; or the depression of the water-line may arise from the evaporation of the water, caused by the gas passing through it. But this opens up two questions. The fault in the meter, looking at it as a fault in point of integrity, is the fault of the person who puts in the water; but there is a fault in ordinary wet meters, if not over-filled—the fault of the variation of the water-line getting below; still it is not a fault of the same nature as the over-filling of the meter.

By Mr. DENISON: The meter has a provision in itself, by which it stops acting altogether, if the evaporation extends below a certain small point.

By the COMMITTEE: The remedy which I suggest is, that the spout should be at the level of the water-line, or that it should not exceed 2 per cent. I think it would then become a regulated line; and therefore, if the meter inspector tried it at that point, so far his certificate would be consistent, which at present it is not. Inaccuracy would not be impossible in such a case, because evaporation would cause the water-line to descend.

By Mr. DENISON: There is a way of getting over that, by adopting the compensating principle. There are various meters besides those manufactured by me, which profess to guard against the effect of evaporation by compensation.

Cross-examined by Mr. BURKE: I am a meter maker, and have been in business since 1855. I was previously connected with my relatives as an assistant for five years. That firm is carried on still, under the name of Parkinson and Co. I do not consider that my meters are more liable to deteriorate rapidly than other people's. Everything deteriorates by degrees. How long a meter full of water and subject to the action of gas will last depends upon circumstances. I have known some which will deteriorate in the course of three or four years; and, if I may believe the badges upon meters which have come to me for repair and alteration, I have seen them of 23 years back. They are subject to alterations and repairs. A meter may last three or four years, and then become useless; or it may last eighteen or twenty years with repairs; but I must qualify my answer to that, because I must confess that I cannot quite understand some of those badges upon the meters. I cannot answer whether the meters had not been entirely reconstructed by degrees in the meantime. If they were reconstructed in the meantime, that would imply that they had worn out at an earlier period than I mentioned. From my experience as a meter maker, taking the value of the meter at a given sum, I should think that 12½ per cent. would pay a meter-maker for the use of it, but I should not like to pledge myself to that; there are many constructions of meters, and some wear out earlier than others; I can merely give a general average.

By the COMMITTEE: Taking the view of it that a meter practically lasts about eight years on an average, 12½ per cent. for deterioration would reimburse the maker at the end of that time. I should give about 12½ to 15 per cent. as a rent that would be fair to charge quarterly with the gas account. That would pay interest, and replace the capital.

By Mr. BURKE: My belief is, that the high-spout meter is the one most universally used, but I cannot give it as a fact, unless I saw a return from all the country. I do not know what the present rules of the metropolitan companies are, as to allowing consumers the choice of any meters which they themselves like to adopt. I only know that when I was supplied with gas at my own house, I was obliged to purchase a meter. Nothing was said to me upon the subject, as to whether it should be a high or low spouted, or a dry meter. My answer applies to the meter at my house; but when I wanted a meter for the stable at the back of my house, I was told that I must obtain the meter from certain makers, and a list was given to me. I cannot precisely give the number of makers included in that list—probably there might have been nine or ten. They were all respectable men, for anthing I know to the contrary. The firm of Parkinson and Co. was among them. They were not the successors of my late relative, Mr. Samuel Crosley; there were other proprietors between them. They are a respectable firm. They made only high-spout meters. I was given a list of dry meter makers, and a list of wet meter makers. I remarked at the time that I would not have a high-spouted meter, and I got a low one. The company objected to the two which I had before that. They were objected to because they were not satisfactory. I obtained one from Mr. Edge. They did not say whether the meter registered properly or not, but there was a complaint about the index being what they called a jumping index; whether they had tried it or not I cannot say. I understood they did not attempt to prove it. I do not say that a company should be compelled to take anybody's meter without trying whether it is right or not; but in that case, as far as I could gather, they had not tried it. I was told so by the man who took it. I did not apply to the company myself upon that subject direct. The message I received was, that it was a jumping index. I got a low-spouted meter from Milne and Son, to which there was an objection made. The answer in that case was, that they would not allow it to be put up, because it was capable of being made to register against the company. They did not say because it did actually register against the company, but because it was capable of being made to do so. I presume it had been tested by the company, because they gave as the result of the test that it was capable of being made to record to the extent of 15 per cent. against the company. Some of the makers whose names were given to me, do make low-spouted meters when required to do so, and also supply dry meters to a large extent. The latter are not liable to the objections which I have stated as to the rise of the water-line, but they are liable to far more insidious objections, because you may test a dry meter with the number of lights it profess to carry, and it will give you a certain result; but if you put that meter to work in practice, and you do not work at the same speed, and under precisely the same circumstances as when tested, it will give you a totally different result. I entirely dissent from the statement that the public, and all meter makers, have a thorough knowledge of the circumstances attending dry gas-meters. I say the consumers have very little knowledge on the subject. I do not know of any legal means of a consumer ascertaining and obtaining satisfactory results, because he must go to an experienced person, and the only experienced persons are either connected with the gas companies or are meter makers, and I do not think that either of those persons are the persons to whom he should go—for instance, the meter makers generally are dependent upon the gas companies for their business; and I am quite satisfied of this, that if a meter maker gives any information to gas consumers, as a rule the gas companies will not continue their business with him if they know of it. I have an example in my own case, because I took upon myself to give evidence before a committee of the House of Commons, I have suffered severely for it, and I think it a great hardship indeed. In this case, in which I am summoned by an order of the House to give evidence to this committee, I am not consulted either upon the part

of the vestries, or upon the part of the gas companies. Neither of them, as far as I am aware, know what evidence I am prepared to give. They take it for granted that I am prepared with evidence, in consequence of what I have given before. But I may say, that I have been a great sufferer in consequence of the evidence which I have given in one of these committee rooms before. I have not been getting up this case for two years past in order to attend this committee. I anticipated that there would be a committee of investigation in reference to the Sale of Gas Bill. I do not deny that I have been informing myself as to the state of things in the country, with a view to giving evidence in case there had been such a committee; but there never has been such a committee, and therefore I take for granted that that will be a sufficient answer to your question. It is not a very gratifying position to be placed in, to be summoned here against my will. I have a patent meter of my own. In answer to your question, I do not supply meters to the London companies generally; and this being a metropolis question, I do not see that that has anything to do with the metropolis. Your question is with a view, it appears to me, to bring before the committee a patent meter that is not in use in London, and has not anything to do with the metropolis inquiry. I think the London public suffer by my not supplying them with my patent meter. I do not decline to supply them; I never said so. London has not availed itself of my patent. I have no particular feeling with regard to the London companies. I think it is easily accounted for why they do not employ it. From the examination of the meters I have seen, I think it is a sufficient answer. They refused to take my meter long before any gas inquiry took place; and I have given the reason why I think they did, which is the variations in the water-lines in the wet meter, and the liability to variations in the diaphragm in the dry meter. Probably the perfection of my meter is one reason why the London companies do not take it, but that is not all. I supply it in the country. My meter does not require weekly investigation, nor more than once in three months when properly and fairly treated. I did not say in Manchester, but in some large establishments in Lancashire, they visit the meters once a week. Those are not my meters. The Lancashire manufacturers do not use them, because there are other interests to be consulted. The meters are regularly attended to in those instances I refer to once a week, and to that extent the man himself acts as the compensator. He goes and does that once a week which my instrument performs for itself; and the man is generally the servant of the company, and the consumer does not care what expense the company is put to. The servant of the company visits the meter once a week, on purpose to keep the water-line up to its mark, to secure the company. I do not complain of the London companies securing themselves; they have a perfect right to do so. I complain, that they do not stop at the limit where it would do that. It does not necessarily follow that, if the Lancashire consumer had an opportunity himself of securing that there should be no undue registration of gas by means of my meter, that he would avail himself of it. I have not been much among the Lancashire companies. The experiments I made upon meters purchased in London was in June, 1858; they were purchased for the purpose of experimenting upon them, and of giving evidence before the committee. They had not been tested by the gas company, but they were purchased from makers who supply the London companies. They had been tested by the manufacturers. I do not believe it is a common custom with companies to allow a rebate when an appeal is made upon any proof of a meter registering fast—that is my belief. I took a great interest in the Gas Act of last year; I was very active in it, and assisted Lord Redesdale in the passing of that Act. I employed a solicitor, not with a view of bringing in an Act of Parliament, but I consulted a solicitor, and asked him to advise me whether the Government would be likely to introduce a bill. As there was an Act of Parliament regulating all ordinary weights and measures, it struck me as a great anomaly that gas-meters should not be under the same category, seeing, as I did see, that there were enormous irregularities, to say the least of it, in the registration of gas; and I thought, if Parliament took up the matter, and put gas-meters in the same category as all other weights and measnres, it would be a very good thing for all of us. I did not assist in preparing the clauses of that bill. The draft of the bill was prepared before I was consulted as to the tenor of the clauses. I know that the bill, from time to time, received amendments in its passage through the House. I was consulted as to what those amendments should be, and occasionally gave my advice, but it was not taken in all cases. My advice not being taken has nothing to do with the Act being imperfect, because a great many amendments were made in the bill in the House of Commons. The object of my evidence here is to answer the questions you put to me.

Mr. BURKE: Supposing the Act of Parliament of last year to have declared, as we know it did, that hereafter meters shall be made so as not to be capable of registering more than 2 per cent. wrong, what have you to complain of in the existing state of the law?

Witness: What I have to complain of in the present state of the law is, that according to the tests that the law requires, it will not detect those errors which will exist in the dry meter in practice. I think that the meter Act as it has passed will correct, to a very considerable extent, many very flagrant errors in gas-meters at the present time, but it will not correct the whole of them. The Act does require amendment; but I may say that I am of opinion, notwithstanding, that that Act ought to be put into force, so that the defects which I believe to be in it may be found out in practice. I do not think that, because there are defects in it, that is any reason why the existing Act should not be put into force. The Act is a public Act, and the Government has to put it in force. I believe they are responsible for carrying it into effect. I was only one amongst many others who were consulted in reference to that Act, and I found that other persons' opinions frequently prevailed. My patent meter is a wet meter. I began to issue it in 1856. The first number was No 1. of the patent principle. I recollect the evidence I gave last year. [Mr. Burke read two or three questions and answers from the evidence before the committee as to the number 47,001 on one of the meters produced.] Of course, when we have many meters, our object is to trace to whom we sell those meters; and if they should at any time come in for repair, we want to trace them. Those are numbers of easy reference; they are the private numbers we employ for the purpose of readily referring to the particular meter in our books. That has nothing to do with the number of the meters that are made, and does not profess to have.

Re-examined by Mr. DENISON: The No. 517 was the correct number of the meter made when that one was sent out; and if the number had been 5000, it would have indicated that I had made 5000 patent meters. It is a fact, that there are advertisements appearing in the JOURNAL OF GAS LIGHTING by makers, who undertake to keep meters in repair for twenty years for a certain sum.

Mr. BURKE objected to this kind of evidence being received

Re-examination continued: I declined to come here except upon an order of the House. I had no opportunity of preparing a proof in the ordinary way from which I could be examined; it was impossible for me to look up my papers, and I came quite unprepared to answer either of you. I have not suggested any questions for any brief.

The CHAIRMAN: For an unwilling witness, this gentleman has given his evidence in a very creditable manner.

Mr. *Thomas Livesey*, examined by Mr. DENISON.

I am an alderman of Rochdale. The gas-works there are in the hands of the corporation, and I am chairman of the gas committee. At the last census, the borough of Rochdale contained a population of 30,000; and we have a town outside the borough which contains 20,000 inhabitants. The population is growing very much; and I expect the next census will give 40,000 within the borough, and fully 20,000 outside. The corporation debt is £45,569, and we pay 4½ per cent. upon it, which is £1932. We are compelled by Parliament to pay a fortieth part of our debt off yearly; last year, it amounted to £1168. Besides paying this and the interest, out of the profits of the gas-works, we re-clothed two gasometers, at an expense of £500, from revenue, and we had a balance of profit of £3362. That makes the profits for the year £6962. The corporation bought the works in 1844, and raised the money for the purpose upon the rates of the town. We gave £27,000 for the works, and borrowed £30,000 to pay for them; but we wanted a little extra money to carry on the business. The debt is only £45,000 upon the works at present. During the time we have had them, from the profits, including this year's, we have paid over £20,000 to the borough treasurer. This year, our profits being £3362, it makes a total, including this year, of £23,991. 19s. 11½d. realized as profits, and paid over to the borough treasurer, for the improvement of the streets of the town. We made little profit the first few years. The works were in a dilapidated state, and we improved them very much. I have a copy of the statistical table [handing the same to committee]. We publish this, and circulate it. The consumption of gas by private consumers in 1846, which was the first complete year after we purchased the works, was 21,176,752 cubic feet; and in 1859 it was 62,387,000 cubic feet. This year, it must be fully 10,000,000 more. Our gas year closes in March; but we have not made up our accounts in reference to the quantity. Last year we used cannel coal, and we paid for it £4995. 16s., and for common coal, £843. The price of cannel coal is 15s. 1½d. per ton, and common coal, 8s. The gross value of the residual products for the year was £182. 10s. for tar, £70 for ammoniacal liquor, £637. 18s. for coke, and £14. 3s. for spent lime. In 1846 we had, from a mixture of coal and cannel, which was about two-fifths of coal and three-fifths of cannel, 9308 feet of gas per ton; and now, with a mixture of four-fifths of cannel and one-fifth of coal, this last year the average was 10,004 feet per ton. That was for the year ending in March, 1860. When they began the works, the price of gas was 7s. per 1000 feet. We reduced it to 5s. in 1851, we reduced it to 4s. 6d. in 1852, and to 4s. in 1853; and so it has remained ever since, subject to a discount. The lowest price is 3s. 3d. Any person using 100,000 feet is charged 3s. 9d.; 400,000, 3s. 6d.; and 800,000, 3s. 3d. Outside the borough, where they are not liable in regard to the works, we charge 4s. 6d. to mill-owners, and 5s. to private consumers. The average price for the public lamps is 3s. 6¾d. per 1000 cubic feet; and the average to all consumers a little over 4s. The number of consumers has increased from 904 to 8557.

By the COMMITTEE: Taking the two periods, viz., the time when the gas-works were purchased and the present, the increase of the population in the borough has been 12,000 or 15,000. Taking the radius where our works go, the gross increase in the number of our customers is 7600; that is, we have increased the number of our customers ninefold, and the quantity of gas supplied about fourfold.

By Mr. DENISON: The number of houses in the borough is 7106, not including mills and workshops. Of these 6171 within the borough are supplied with gas, and 935 do not take it.

By the COMMITTEE: The borough is a circle, and the centre is three-quarters of a mile from the circumference. The works are a quarter of a mile from the centre; they would be within half a mile on one side and a mile on the opposite side. The longest distance that we go without the borough would be a mile and a half, perhaps. Outside the borough we charge an increased price.

By Mr. DENISON: The price outside the borough is 4s. 6d. per 1000 to mill-owners, subject to a discount, and 5s. to private consumers The gas committee have now before them a proposition for a further reduction. The raw material is now above its natural value, and wages also are high, or I believe we should have reduced the price. Very probably we shall reduce it, if coal and cannel come to anything like their natural value. Though there are so many houses in the borough, we have very few bad debts. The total amount since the works came into our hands has been £275.

Cross-examined by Serjeant WRANGHAM: We have a parliamentary limit to our price by the Act of 1853. I think it is 5s. Our gross capital account is £61,000. The price we paid for the works was £24,000, and we bought the land of the vicar, for which we gave under £2000, and we had the matter before Parliament; so that we debited the works with a certain amount for Parliamentary expenses, that made a gross of £27,700. I do not know what amount the company of whom we bought the works had laid out upon them. They were paying 12 or 12½ per cent. dividends, and the price they were charging for gas was 7s. per 1000. Our rental last year was £14,387. 12s. 6d. for gas, and our receipts from every source £18,127. That includes £2000 borrowed money; the remainder is for gas and sale of meters. There are many large consumers of gas in Rochdale; the highest rental from any one individual would be nearly £300. I cannot tell the number of such consumers. The number of people that are allowed discounts will not exceed 40 or 50. The amount of rental at which we begin with discounts is on 100,000 cubic feet; the next 400,000, and the next 800,000. We use four or five-sixths of cannel coal, and the rest common coal, in making gas. The price of cannel is 15s. 1½d. a ton. That is rather a favourable contract; we should have to give more now. We pay our stokers 20s. a week in the day time, and 21s. at night; they work one week in the day, and the next in the night. We have the power of cutting off the gas if a consumer gets in arrear beyond what we think is right, and we do it occasionally.

By Mr. TURNER: There is no agitation just now in Rochdale for lowering the price of gas.

By Serjeant WRANGHAM: Our mortgage debt is £45,569; in that is included the cost of the works. We put aside a sum for depreciation, and that, with the amount in stock at the end of the year, makes the difference between the £45,000 and the £61,000. For depreciation between 1844 and 1854, we put aside £9060, which we absorbed in the works. The gross value, therefore, is £61,000, but the debt upon it, which is money owing upon it, is £45,000. Instead of making use of that, we have depreciated the

charge upon the works that much. We have paid off the difference between £61,000, the original cost, and £45,569, the present debt, or sunk it in the increased value of the works to that amount.

By the CHAIRMAN: We have expended in one way or another, including the original price of the business, £61,000, which is now reduced to a sum of £45,569. Besides that, we have added out of profits various sums to apply to the works, which we need not have done, but which we thought it wise to apply, in order to increase their value; but we have not added that sum to the capital account, but only consider the works as having a debt of £45,000.

By Serjeant WRANGHAM: The fixed capital of the works in 1844 was £27,700. From March, 1859, to March, 1860, it was £58,795, or nearly £59,000, and we have borrowed £2000 additional, which makes the £61,000. In 1856-1857, our debt was £40,638; we then enlarged the works to a considerable extent, and we make four times the quantity of gas now that we were making in 1844. Our customers have increased from 6377 in 1857 to 8557 in 1859, and we have had to lay out additional money to meet the increased demand.

Mr. *Robert Bell*, examined by Mr. DENISON.

I am the manager of the Rochdale works. The coal, after deducting the residual products, works out 1s. 1¼d. per 1000 feet of gas.

By the COMMITTEE: We burnt 7000 tons of cannel, and about 2000 tons of common coal during the last year. The residuum of cannel coal is much less valuable than that of common coal. The 1s. 1¼d. is the difference between the gross price of the cannel, and what we have sold the residual products for. Our coke is very bad to sell.

By Mr. DENISON: The gross cost of the coal, the cannel and the lime, was £5994. 14s. 7d., the total products £904. 11s. 4d., and deducting that from the gross cost, it leaves 1s. 1¼d. per 1000 feet on the total quantity of gas registered. We used 9130 tons 14cwt. 3qrs., and dividing the £904. 11s. 4d. by that, you have 2s. per ton for the residual products. We work at a pressure of one inch during the day, and two inches at night up to eight o'clock, and then we gradually reduce it till, at twelve o'clock, it is down to one inch again.

By Lord R. CECIL: That is at the works.

By Mr. DENISON: A great many of our consumers cook by gas. At some parts, the pressure in the service-pipes is an inch and a quarter during the day. Mr. Livesey was mistaken in saying the longest distance which we supply is a mile and a half from the works. We supply Small Bridge, which is something like two and a half miles off; it is beyond the borough. The lowest pressure at one part of the town, which is rather lower than our works, is abouth 8-10ths.

The CHAIRMAN: I do not quite understand this; you say the pressure is one inch by day, and two inches at night, up to eight, and then you gradually reduce it to one inch up to twelve: what was the answer you made about the service-pipes?

Witness: I was asked the pressure at the service-pipes, and I said, in one part of the town it was an inch and a quarter; at the works it was one inch; and at another place, which is situated below the level of the works, it is only 8-10ths during the day.

By Mr. DENISON: There would be no difficulty or inconvenience in giving never less than an inch on the service-pipes. We tried to reduce it below an inch, but we then had complaints from persons cooking by gas that they had not a sufficient supply. I am not aware whether there is less cooking by gas in London than in our town.

By the COMMITTEE: Our works are situated at nearly the lowest part of the town.

By Mr. DENISON: The total cost of cannel with us is £4995 a year; the coal, £834. 5s. 1d.; the lime, £169. 13s. 6d.; making the total cost £5999. 14s. 7d.; and the residual products, £904, being deducted, leaves £5095 as the cost of the raw material. We sent out last year 91,348,000 feet of gas last year, which works out, as the cost of the raw material, 1s. 1¼d.

Cross-examined by Mr. RICHARDS: I consider an inch pessure is as large a pressure as is desirable over the district in the day time. Our Act of Parliament does not provide for pressure. I do not see that the particular level of the district which the company may be lighting, will make much difference. We had complaints before we raised it to an inch. The Rochdale supply, as compared with London, is very small. The wages of our men were 21s.; they are now 22s. The cost of gas I admit depends entirely on the cost of wages and coals. We have a very good profit, and are talking about reducing the price 6d. per 1000 feet.

Re-examined by Mr. DENISON: The price of gas depends upon the cost of the residual products, and the first price of the raw material, the coal. We have got on very well since we raised the pressure to one inch. I am the manager for the corporation, and they do what they can to satisfy the town.

By Lord R. CECIL: The chief part of our mains have turned and bored joints. They were originally laid with lead joints, and there are some of those left now; but any pipes which we take out we relay with turned and bored joints. We took one main out last week which had been down twenty-four years. It would take a long time to relay all the mains in the town. The illuminating power of the gas supplied to Rochdale is 20 candles; that is about the average from the material we use. It may vary from 18 to 21, because the cannel and coal is not quite so good sometimes. We find it go lower without knowing that it will do so. We are under no parliamentary restrictions as to purity.

By Mr. NORTH: We supply meters. None of our customers supply themselves; but if a consumer comes from another town, and brings a meter with him, we allow him to use it, after being tested. We employ one of our men to do that. We have no official person in Rochdale to test meters.

Mr. *David Chadwick*, examined by Mr. DENISON.

I am the treasurer of the borough of Salford. The gas-works there belong to the corporation. They took the works into their hands in 1830, and rebuilt them not many years afterwards. The total profit on the capital invested in the works is £13,166. 6s. 3d., being equal to 13½ per cent. on £97,000. We make gas in Salford from three kinds of cannel coal, the average price being 15s. per ton. The value of the residual products is 2d. per 1000 feet of gas. The average cost of the raw material is 1s. per 1000 feet, after deducting the residual products. [Witness handed in a table showing the capital invested in the Salford Corporation Gas-Works, the quantity of cannel used and gas produced, the gas rental, and the amount of profit in each year, from 1840 to 1858.] The column headed "per centage on gross capital," shows the profit earned in every year since 1840, after deducting the charge for depreciation, and paying all expenses, except interest. This is speaking of profits as a London company would speak of them, the interest being really dividend. The last column shows that the net profit of last year was 10·66 per cent. on the capital; the year before, it was 11·75 per cent.; and before that, 13, 18, and 20 per cent. The present price charged for gas is from 4s. to 4s. 6d., within the limits of the municipal borough, and from 4s. 6d. to 5s. beyond the borough. The limits of the municipal borough extend to a radius af about three miles. The illuminating power averages 20 candles.

By Lord R. CECIL: We have works in the centre of the borough, and we have recently erected new works a little further out. We mean to supply from both of these works.

By Mr. DENISON: The quantity of gas made last year was 166,000,000 feet. The consumption has doubled since 1850. The working expenses in 1852, exclusive of coal, amounted to 10·4d., and last year they were 11·8d. per 1000 feet. The question of the price at which the public lamps are supplied has been a subject of investigation in the borough for three years. The price charged for the previous years was 12s. 6d. per 1000 hours; but an examination into the actual consumption of gas per street lamp has led the gas committee to reduce the price to 10s. per 1000 hours, and they find that that is rather a heavy price, and that they get rather more profit out of them than they get out of the ordinary consumers. That has been proved by the application of meters to lamps in twenty cases. Ten shillings per 1000 hours comes to 4s. per 1000 feet. We find the whole of the gas-fittings and keep them in repair, but we do neither the cleaning nor the lighting of the street-lamps. We supply meters to the private consumers at a reasonable rate. I think 1s. per quarter is the lowest price we charge. I have seen the prices which it is proposed by this bill to charge for meters in the metropolis; I think they are a little lower than ours. I cannot give any comparison, as I have only seen the bill to-day, but I can put in a statement of the actual amount of receipts and expenditure on the hired meters account, showing the amount which they have cost us, and the profits which we have made during a certain period. This table shows that, since the Salford corporation commenced letting out meters on hire, during four years, they have fixed 2157 hired meters. The amount received for the hire of those meters each year has amounted to £790. 1s. 8d. for the whole of the four years. The gas supplied through those hired meters has been charged at £5900; the estimated profit derived from the gas supplied through those hired meters is £1500. This statement was only made to show that the supply of hired meters to the working classes was not only a very important matter in itself, encouraging cleanliness, and giving them the benefit of light at a cheap rate, but that it was a positive profit to the corporation. This was drawn up with a view of proving that it had a double benefit. [Witness handed in a table, showing the amount expended by the corporation on account of hired meters; the number in use; the amount charged for rent, and the amount received for gas supplied through hired meters; and the estimated profits thereon, in the four years from June, 1855, to June, 1859.]

By the CHAIRMAN: The number of hired meters is 2157, and the amount invested in them is £2866, including fittings and fixing. The estimated profit on the gas supplied through those meters was £1569.

By Mr. DENISON: We do not make the in-coming tenant pay gas-rents which the previous tenant owed, but we did do so up to last year. After a great desire to do that which was right to all parties concerned, our gas committee came to a unanimous resolution, that it was not right to continue further to charge an in-coming tenant with a liability incurred by a previous tenant, and therefore they determined not to continue that practice. I may as well tell you what they substituted for it. They thought it would not be well entirely to give up the right, and they have adopted a rule which has been found to work well for a year and a half—that, whenever a loss is made by a tenant leaving premises without paying the gas-rent, those premises are placed in what we call a black ledger; and, from the date on which the loss is incurred for gas supplied to any premises, no future tenant can be supplied at any of the premises which get into the black ledger without security being given for the future gas-rent. We have found that that answers every purpose; and, indeed, we find that, by asking the landlord for payment, in three cases out of four, he will not trouble himself by giving a guarantee, but he will clear off the old tenant's arrears as a matter of convenience. We do not ask it, but we give a printed form, and afford every facility.

Cross-examined by Mr. RICHARDS: There is no appeal against the black ledger. Once in the black ledger, and he does not get gas without security. You may strike out of the table put in, the estimated profits in the gas supplied through hired meters. It was not prepared for my evidence here, but I can explain what it was intended to prove, if you will allow me. This was a statement ordered to be made by me to the corporation, with a view of showing the effect of our operations in regard to hired meters; and, whilst this statement was being prepared, some members of the gas committee said—"All that is very good, but you do not show us the profit which we have made upon the gas." I here calculate the profits upon the gas consumed by the hired meters, and in a note I say, I deduct for all the gas consumers by the hired meters 28 per cent. of establishment charges more than the ordinary gas consumers, in order to arrive at the real net profit derived from the consumption of gas through hired meters. It was intended to prove in reality we do the people service by giving hired meters at 1s. per quarter, and the corporation get a profit also. The gas would not have been supplied to 2100 houses had we not given them hired meters, because the parties could not have afforded to purchase their own meters; and, therefore, we have received £15. 6s. 9d. additional entirely through the adoption of hired meters. In the case of arrears due from an out-going tenant, of course, if we believed the in-coming tenant had received the gas-rent, we should expect him to pay it over to us; or if there was anything like collusion between the in-coming and out-going one, we should require it. We have only lately begun to supply meters on hire, and at present have had no repairs to encounter; but I make this extraordinary remark under the column "Cost of repairs," that no repairs have been needed on the 2000 hired meters during the four years, or, at least, the charge for repairs has not exceeded 10s. I am not called upon to give an opinion as to whether that very remarkable circumstance will be followed by their all requiring repairs in eight years. I cannot say what is the smallest size meter we put down; it is either a two or a three-light meter, but 1s. is the minimum sum we charge. We should not supply hired meters for more than five or six lights. The charge goes up to 4s., 5s., and 6s. a year; the advance is very small. The 1s. a quarter which we charge, is scarcely to be considered as for the hire of the meter, but for the trouble our servants are put to. We do not regulate the charge for hire of meters by their cost: we do not look upon it in that way. We have introduced it, and in all probability we shall have, in the course of three years, 5000 customers. We do not charge the rent at a per centage upon the value of the meters; but we do this—we charge the rental upon the value of the meter, and the additional trouble which it causes our servants in collecting those small sums of money; and we say 1s. a quarter is the smallest sum we can afford to charge under those circumstances. We have made a large deduction from our capital every year for depreciation. During the last twenty years, I should say that we have deducted from the value of the gas-works, perhaps £15,000. I do not know that you may add that £15,000 to the £97,000, as

the capital which we should have expended, but for the saving we have effected from year to year; because, in every well-regulated gas works, they take account of depreciation year by year. We have taken an account of depreciation, and kept a regular account of the cost of replacement. I should think that, on account of deductions from capital, it would be fair to a £10,000. That would rather reduce the 13½ per cent. We last reduc the price of gas two years ago. All our customers are the managers the works themselves; the inhabitants have the entire charge, and the consequence is that, in Salford, we expose all the gas secrets to the public ge. Our customers are content to pay the present prices, we making ½ per cent., because we appropriate that to the improvement of the tow We have the Hulton coal, and Lord Granville's coal. The Wigan al is 15s,, Lord Granville's is 13s. 9d., and the Hulton is a price betwee the two; but 15s. is the price that we have to calculate from, becaus nine-tenths of what we use is the best Wigan cannel. I cannot speak om memory as to the rate of wages; the retort men average 30s per week id the labourers 18s. The price of common coal is 6s. 8d. per ton, or 4d cwt. The price at which we can supply the manufactured article depes upon the price of coal, the price of coke, and the rate of wages.

Re-examined by Mr. DENISON: We paid in wages last year £3495. I have not e number of tons of coal used last year; the year before it was 15,000 ton The amount of wages in that year would be about £3000, which wo bring the cost of labour to 4s. 7d. per ton of coal distilled.

Lord R. CECIL: I would rather not speak as to the pressure in the da time; I am only the treasurer.

Mr. *T. Abercrombie Hedley*, examined by Mr. WEBSTER.

I am a civil engineer, residing at Banbury, and have had upwards of twenty-five years' experience in the manufacture and supply of gas. I am gineer of the Banbury Gas Company, and contractor for the supply of as to the Uxbridge New Company. I have been resident engineer of the works at Banbury for seven years. I have been contractor for the Uxbridge works during the present year, and I have been lessee of the Wallingford works about four years. I have been concerned in extensive works in Dublin, London, Devenport, and other places, for the last twenty-five years. In those places, I have used Newcastle and cannel coal. In London, until the last few years, the Newcastle was the principal coal used.

The CHAIRMAN: Do I understand that you have been concerned for any gas-works in London?

Witness: In London, in Dublin, and in Devonport.

By Mr. WEBSTER: I think 3s. 6d. per 1000 would be quite an ample price for ordinary coal gas in London of 12 sperm candles' power. The dividend upon that price would depend a great deal upon the amount of capital invested: if the capital were judiciously spent, it would be 10 per cent.

The CHAIRMAN: I suppose there is no gas company but would meet that by saying that they had spent their capital judiciously.

By Mr. WEBSTER: For gas of superior quality—say 20 sperm candles—5s. would be a sufficient price. Cannel coal can be used very beneficially in London, both for the companies and for the consumers. To make the same quantity of gas, smaller works are sufficient with cannel coal, and less labour is required. It takes six hours to carbonize common coal, whereas it only takes four hours to carbonize cannel; therefore, the works for the manufacture of cannel gas need only be two-thirds of the size of the works for the manufacture of common coal gas. The men would have to work six hours in the one case against only four hours in the other. There is also a saving in the mains, as smaller ones are sufficient for cannel gas. Three feet of cannel gas will give the same light as five feet of common gas; therefore, the same sized mains would supply a larger quantity of cannel than of common gas. It is also more to the interest of the companies to use it; and, as regards the consumer, there cannot be a doubt about it. Three feet of cannel gas being equal to five feet of common London gas, if a man were charged the same for both gases, and he got as much light out of three feet of cannel gas as out of five feet of common gas, his meter would go round in the proportion that three is to five, and to that extent he would save. The more gas a man consumes, the greater is the amount of deleterious products evolved. If a man burns five feet of common gas, and it only gives the same amount of light as three feet of cannel would, he is injured to that extent, because the greater the combustion of gas, the greater is the amount of the products of combustion injuring his gilt-work, and so on. The only advantage in the supply of common gas as compared with cannel, is the pecuniary advantage of supplying five feet instead of three. The London gas companies have always had the credit of working at a very high heat, and at very long durations. Some years ago, the companies in London used to be called "light gas" companies, in contradistinction to "gas light" companies, as they were called in Lancashire—that is to say, the gas was light, and fit for balloon purposes. The higher the heat, and the longer the duration of the charges in making gas, the more the consumers have to burn to get the light they require. The remedy for that, is the shortening of the period of carbonizing.

Lord R. CECIL: What is the temptation to use such a high heat?

Witness: It deteriorates the quality of the gas, so that the consumers have to take so much more of it.

Mr. WEBSTER: Do the companies get more out of the coal?

Witness: Not so much; but the quality of the gas is deteriorated.

Mr. WEBSTER: So that paying by quantity, and not having a standard of comparison by which to test it, it is the interest of the companies to make as much gas as they can, and at as high a heat as possible?

Witness: Yes, it is as great a farce to buy gas by quantity without a standard of quality, as it would be to buy spirits without having them proved.

Mr. TURNER: Is the injurious effect of the gas very much increased by its being made at a higher temperature? Is there more sulphuretted hydrogen in it?

Witness: Yes; and the consumers have to burn much more of it to get a proper light, and a larger quantity of deleterious product is evolved.

By Mr. WEBSTER: I use Newcastle coal at Uxbridge, which I buy in the Thames, and get by means of canal boats. I give 13s. 3d. a ton for coal in the Thames, and have to pay for taking it to Uxbridge. Wages there are very similar, I should fancy, to what they are in London; men would not stay in Uxbridge and work for less wages than they could get in London. I am bound by my contract to supply gas equal to 12 sperm candles. You will excuse my answering as to what is the price at which I supply that gas to the company. I supply it at such a price, that the company are able to sell it to the consumers at 3s. per 1000 without loss. During the whole of the last year, the average price of Newcastle coal at Uxbridge was 15s. 2d. per ton. I believe the price I paid last week for coals was higher than last year.

Mr. WEBSTER: You told us that you supply the gas company at Uxbridge at such a price as will enable them to sell it at 3s. per 1000, what is the nature of the contracts they are prepared to enter into at Uxbridge?

Witness: I should state that there are two gas companies in Uxbridge, and with the intention of getting rid of one of the companies, the price was offered to be reduced; but they offered to enter into a contract with the local board, or the competent authority, that the maximum price of gas should be 5s. per 1000; that upon the consumption reaching 30,000,000, it should be 4s. 6d. per 1000; upon its reaching 40,000,000, it should be 4s. My contract with them is to make gas at such a price that they should be able to sell 40,000,000 at 4s., paying a large dividend to the shareholders upon the capital of the two amalgamated companies. The smallest company in London makes five or six times that quantity in the year. I know the case of one company where the increase in one quarter, over the corresponding quarter of the previous year, was 70,000,000. A London gas company supplying such large quantities, ought to charge less than they do at Uxbridge, and that is why I said 3s. 6d. would be sufficient.

By Mr. TURNER: I am under contract to make gas at Uxbridge equal to 12 sperm candles, but as I only work at moderate heats, the difficulty is to make it at that. I use the ordinary Newcastle coal.

Mr. PACKE: Have you made any calculation at what price per 1000 cubic feet cannel gas could be supplied?

Witness: I have given evidence before upon this, and I have gone into the question, having been connected with cannel gas nearly all my life. Cannel coal gas, if a mixture of Newcastle coal is used in the manufacture, can be supplied at 4s. per 1000, giving the same profit of 10 per cent. The illuminating power in that case would be from 18 to 20 candles.

Mr. TURNER: If you can supply cannel gas with an illuminating power of 20 candles at the price of 4s., why is it necessary to charge 4s. for 12 candles at Uxbridge?

Witness: In the one case it is a very small town, where 40,000,000 a year is supposed to be the consumption; in the other case, some of the companies supply a quantity in no comparison with that. In the one case I was speaking of my contract with the gas company; in the other I was speaking of what a company could sell it at in London.

Mr. TURNER: Supposing a gas company in London, supplying 40,000,000 feet of gas, charged 4s. for a light equal to 12 sperm candles, what should they charge for cannel gas giving a light of 20 candles?

Witness: That has never been suggested to me before, and I should not like to give an opinion upon it, because it would affect the town for which I am a contractor. The price at Uxbridge covers the dividend to the companies and my own profit.

By Mr. WEBSTER: Looking at the system of districting which prevails in London, that is a reason, in my opinion, why gas should be sold at a lower price than under other circumstances. It is the most beneficial thing possible for companies to have the districting to themselves. In my opinion, the price of coal does not influence very materially the cost of the gas. I have always stated that I believe the amount of gas made has more to do with the price than the cost of the raw materials. Looking at that fact, I think the price of gas ought to decrease as the quantity of gas made beyond a certain amount increases.

Mr. TURNER: You can scarcely mean to say that the price of coal does not affect the price of gas?

Witness: Wherever the price of coal rises above a certain amount, the price of the residual products rise in proportion. Wherever coals are dear, the residual products fetch a correspondingly increased value. I have found that so throughout all the country.

Mr. WEBSTER: Is it consistent with your experience, that in many places the residual products, particularly coke, are more valuable than they are in London?

Witness: Yes; and in the case of cannel coal, where they do not make coke, they have not to keep a large establishment up to manufacture and sell the coke. London gas companies are not now quite the same as they used to be, but they were more coke companies than gas companies; they kept large establishments to make coke, and large establishments to sell it. If they used cannel coal, the establishment required would be very much less than at present. I have always been brought up as a cannel gas-maker, and my father, who used to be very much in the habit of attending these committees upon these questions, tried for a long time to get the London gas companies to leave off making coke, and to make good gas, but he did not succeed before he died. Many of the companies in London are called "Gaslight and Coke Companies." In the malting districts, coke is more valuable than it is in London. In the small town in which I reside, we paid last year £1300 or £1400 for coals, and we got £1200 back for coke, There are other residual products which are valuable, more so in some places than in others. I have always found the value of the products increase as the price of coals rises. Where the gas companies use cannel coal, they are merely gas-makers, and have no establishments to keep up for the manufacture and sale of coke, and therefore the value of that product does not affect them. I am quite certain that the quantity of gas to be made and consumed is much more an element in the cost of gas than the price of the coal. As they increase the consumption, so they lessen the price. In the town I reside in, the price was reduced, three or four years ago, from 6s. 8d. to 5s. Whether the consumption is 20,000,000 or 40,000,000, the charges would be the same. It is a matter of importance to people who use gas for cooking purposes that there should be a certain pressure on the mains during the day; and, now that gas is supplied by meter, it is to the interest of the companies to keep their mains properly charged. They are also able, by that means, to keep their mains in better condition. The amount of pressure which may be necessary depends upon the size of the mains. An inch pressure in the day is not at all an excessive pressure. The mode I have adopted is this: as the lights are lighted I put on the pressure; that is gradually increased for a certain time, and then I commence taking it off gradually. The maximum pressure at Banbury is 16-10ths. There is no difficulty in regulating the pressures at high elevations. If the gas-works were at the top of a hill, and the gas had to be sent down, there would be. If the gas has to go up an incline of 200 feet, and then go down the same, the pressure would not be interfered with. In all contracts that I have made with local boards, I have reckoned that the quantity of gas consumed with an inch pressure has been 5 cubic feet per hour; and as regards the price, the principle I have carried out for some years is, that the same price should be charged for public lighting as for private consumers, and that the public boards who have to pay for the lighting should have the advantage given them of lighting, cleaning, and extinguishing the lamps. I have always considered it a fair principle, as the consumption by the public lamps is sufficient to compensate the gas companies. That is the plan adopted at Banbury. We are charging 5s. to private consumers, and also to the public lamps. I am consulting engineer to the Local Boards of Health at Leamington and Luton. As regards the supply of gas at Luton, I had a difficulty some time ago to get them to alter the standard of illuminating power which they wanted to insert in a bill which was then before the House—viz., 10 sperm candles. With the aid of

my professional brethren, I got it altered to 12, the company professing that they could not give a light of more than 10. I had to visit Luton three weeks ago, and I found a certificate there, signed by a member of the Royal College of Surgeons, in which it was certified that the gas was never less than 18½ sperm candles; whereas, before they got their bill, they stated that they could not make gas of more than 10 candles. I have not had an opportunity of seeing the gas at Leamington, but I was called to attend a meeting of the Board of Health, about ten days ago, and I understand it is the universal feeling in the whole place, that the gas is very bad. They asked me to make certain suggestions, which I did, and I presume that the gas company will carry them out. I think it would be to the interest of the large companies to supply meters free; but, if that could not be carried out, a small fixed rent should be charged. In Banbury, our smallest meter is a 3-light meter. We charge 1s. a quarter for the use of it. Whether it is a 3-light meter or a 50-light meter, we charge the same, unless the consumer pays £20 per annum, when we charge him nothing for the use of his meter. I have seen the prices proposed to be charged by this bill, and I consider them fair to both parties. It is my practice, where the consumption is large, to supply meters without rent; but, if a charge is to be made, that which is proposed in this bill is liberal to the companies and the consumers. In Banbury the people may buy their meters where they please; they may have them of any maker in London, instead of taking our meters: all we ask is, that they should be properly tested. My attention has been called to the provisions of the Sale of Gas Act; I sent up a petition in favour of it. I am only sorry it is not in work. I do not think it is right that a consumer should be made to pay a fixed price for gas without reference to the quantity he uses. It is my principle to get all the small cottages to burn gas, and I am very well satisfied if they take gas to the extent of 10s. a year, and pay 1s. a quarter for the meter. I wish I had a thousand on those terms; but the notion of charging a man 30s. a year whether he burns 5s. worth or not, is not only unfair, but unwise on the part of the companies.

Mr. WEBSTER: You think the pressure of 10-10ths, as provided for by the bill, is a pressure which ought to be given?

Witness: London is so different from many other places; the gas companies have to regulate the pressure so differently in provincial towns. Our pressure is nearly all the same; but in London they have, in some places, small pipes, and in others they have large pipes; the pressure will vary according to the size of the pipes. I do not think that one inch is an unreasonable pressure, especially where gas is used for cooking.

Cross-examined by Mr. HOPE SCOTT: I think the metropolitan gas companies ought more properly to be called coke companies; but that applied more some years ago than now. The gas which they made was more fit for balloons than for lighting houses. I have been connected with the manufacture of gas, and studying the subject in London. I was connected with the Surrey Consumers' Company for twelve months. I was connected with the Chartered Company for a few months, a great many years ago, but not in connexion with gas-making. I have not been connected with any other company in London. I had nothing to do with getting up a scheme called the Marylebone; I was connected with it. There have been two schemes of the same name at different times. In the last, I was only the same as I am now. The solicitor for the promoters retained me, and I came in order to give evidence in its favour. That was to compete with the Imperial Company. I had to do with the Marylebone scheme in 1852. Neither of them has gone on. I was engineer and secretary to the scheme of 1852. I was at Devonport with the gas company seven years. In Dublin I was two years, or something like that; it is twenty years ago. I have been resident engineer at Banbury seven years. At Uxbridge there are two competing companies; the one I belong to declared a dividend of 4 or 4½ per cent. last month, and the charge they make for gas is 3s. per 1000. The old company is a close concern; they have not published any accounts for years, and it is not known what they divide. I do not know how long the new company have been at Uxbridge; it is several years. I began to make gas for this company on the 1st of January in this year. When the new company divided 4 per cent., the price of gas was 5s.—they declared a dividend a month ago. At Banbury, we have charged 5s. for four years; but the consumption is not 10,000,000 per annum. If it were 40,000,000 we would sell it at 3s. 6d. There is only one company in Banbury. It is a small agricultural village, with pipes laid through a large district. We converted a capital of £3000, by means of bonuses, into a capital of £10,000. We pay 7½ per cent. upon the £10,000. We lay out £300 a year in mains, and we lay by a reserve fund of £200. If it were not for all that, our dividends would amout to from 13 to 14 per cent. The gas is made out of Ruabon coal, which costs us 14s., and we get from 7000 to 8000 feet of gas from a ton. The value of the coke varies; I cannot give it you. We laid out £1024. 7s. 6d. for coal last year, and received for coke £724. 10s. 3d.; due for ditto, £360. During the period in which the coal cost us £1024, there was a difference of £200 between the two sums. I distinctly refuse to answer whether the £724 received, and the £360 due, for coke, was in respect of the coal which cost £1024.

The CHAIRMAN (to Mr. Hope Scott): If you will ask him whether the amount for coke represents the same amount of coal, it is possible you may get an answer.

Witness: It does not. It represents the coke for the year, and the balance due from the year before.

Re-examined by Mr. WEBSTER: The account tells its own story. The balance due is partly for that year, and partly for the year before. There is nothing which has been suggested on the other side that displaces the statements I have made.

THURSDAY, MAY 24.

Mr. *John Edward Clift*, examined by Mr. DENISON.

I am a gas engineer at Birmingham. Before that I was engineer to the Birmingham and Staffordshire Gaslight Company. I am now proprietor of the gas-works at Redditch, in the needle district, and have been engaged in the making and distributing of gas for twenty-three years. From my experience, I think 4s. per 1000 feet would be a fair price for gas where circumstances are favourable for obtaining coals and getting rid of the products. I never found that the price of coal made a very great difference in the price of gas, taking into account what we get for the products. I find that, when the price of coal has been high, the value of the residual products has been also high, and that has compensated for the high price of the coal. There may be exceptional cases, but as a rule that is so.

By Lord R. CECIL: That would not apply to the cannel coal as much as to the other; it would apply only to coal where the residual products are saleable and valuable.

By Mr. DENISON: The price we pay for coal at Birmingham is 11s. per ton—not for cannel coal, but for coal from the Midland Counties district. the price for coke there realizes 15s. a ton. That is equivalent to a price back again for the coal of 9s., leaving only 2s. for the price of what we call the raw material. The price of labour is quite as high at Birmingham as in London. We are paying stokers 4s. a day, or 28s. a week, and labourers 3s. a day, or 18s a week; the stokers working seven days, their wages come to 28s. The highest price of gas at Birmingham is 4s. gross, with 5 per cent. discount off for payment in cash quarterly, amounting to 3s. 9d. net; the lowest price is 3s., with 5 per cent. off, leaving 2s. 10d. as the net price.

By the CHAIRMAN: That discount is taken off from the payment of all consumers for prompt payment.

By Mr. DENISON: We make a difference between large and small bills; the smaller consumers pay 4s., intermediate consumers 3s. 6d., and large consumers 3s.

By the CHAIRMAN: In all cases, in the highest and the lowest, we allow a discount for prompt payment. Besides the discount we allow to all, we also make a difference of price, according to the amount of consumption.

By Mr. DENISON: The range is first of all from 3s. to 4s., according to the amount consumed. In each of these cases we take off 5 per cent. if they pay within the quarter; and if they pay within the quarter, that practically reduces the price to this range, 2s. 10d. to 3s. 9d.

By Lord R. CECIL: There are other residual products besides the coke: there are the tar and the ammoniacal liquor. The tar is sold at 10s. a ton, and the ammoniacal liquor at 2s. per butt. There are about 12 gallons of each to a ton of coal. I think the amount works out to about 1s. to the ton of coal. The contract price for the public lamps is £3. 10s. per annum for each lamp; deducting 15s. per lamp for lighting, cleaning, and repairs, which the company have to do, it leaves about 2s. 6d. per 1000 feet for the gas consumed, there being about 21,000 or 22,000 feet of gas consumed for each lamp per annum.

By Mr. PACKE: There is about one hundred weight of tar from each ton of coal.

By Mr. DENISON: The cost of coal affects the price in the Midland Counties very little, because the coke increases with the price of coal. That has always been the case. When we paid 7s. a ton for our coal, we got a proportionally less price for our coke; and when coal has risen above its present price, we have got a larger price for the coke. The other products do not vary in the same proportion, but the price of them is so little, that the difference is scarcely noticed.

By Mr. TURNER: Fifteen shillings a ton for coke is not a very high price, not so high as the price in London.

By Mr. DENISON: I do not know the price in London at the present time. I think it ranges much about the same for coke as it does at Birmingham. Those are the principal elements I have given in the cost of making gas.

By Mr. NORTH: We make about 9500 feet of gas at the station-meter from a ton of coal.

By Mr. DENISON: In consequence of supplying gas to the needle district, I have had to pay attention to its purification. In some portions of the needle trade—in the finishing-room, for instance—they cannot have gas at all; and in the packing-rooms they cannot have it, unless it is very pure; any sulphurous compound takes the polish off the needle. I believe that it is quite practicable, with reasonable care, to supply gas without any of those sulphurous products: and I do not think that any engineer would doubt the practicability of doing it. If the gas is properly made, it can be done, and is done.

By Lord R. CECIL: We do it by purification—by purifying through lime and oxide of iron. To take out the sulphurous compound (which is not appreciable by the usual test-paper), I am preparing to use clay purifiers. It is a patent taken out some time ago by a Mr. Bowditch. It has been used at Wakefield, by using the clay in a finely-powdered state, and damped; and passing the gas through it, we decompose this sulphurous compound. The gas is afterwards passed through lime, and that takes out the sulphur.

By Mr. DENISON: I do not find it necessary to raise the price of gas on account of that, because the cost is so very small, and the material is again sold, so that it really costs nothing. Needle makers, and other manufacturers, object very much to an irregular pressure; it is objected to by all parties who consume gas. In Birmingham, during a considerable number of years—from 1840 to 1858—I invariably kept an inch pressure on the main; that is, an inch pressure at the lowest part of the main.

By the CHAIRMAN: By day and by night, without varying. Of course it varied in some parts of the town; but the lowest part of the town, is the manufacturing part, where the largest consumption of gas takes place.

By Mr. DENISON: In Birmingham they use gas for cooking a good deal; but they use it very extensively in their manufactures during the day. The silversmiths, the jewellers, and the brass-founders use it for soldering very extensively; and, in some manufactures, the consumption is greater for manufacturing purposes than for lighting purposes, so that it is necessary to keep the pressure on at all times.

By Lord R. CECIL: The gas-works are about on a level with some of the manufactories where it is consumed.

By Mr. DENISON: As we never reduce the pressure, we cannot tell whether there is any inconvenient amount of leakage in the pipes; but we calculate the leakage to be from 18 to 20 per cent. Our joints are old lead joints.

By Lord R. CECIL: From the extreme point of the gas district for consumers to the other is about ten miles. The works are not half-way between, in one situation. At West Bromwich the works are about four miles from the extreme point of supply; and in Birmingham they are, perhaps, five miles.

By Mr. DENISON: The Staffordshire coal is not a good coal for making gas. We have to use the Derbyshire and the South Yorkshire. Staffordshioe coal yields very poor gas—8 or 9 candles gas. The gas we supply at Redditch, from South Yorkshire coal, is as high as 14 candles. The Silkstone coal makes gas equal to 14 candles. In Birmingham the meters are supplied by the company free of cost. There are meter inspectors, who are appointed by the company; that is, to attend to the meters being properly charged. The company do all that free of charge.

By the COMMITTEE: There are two companies, and they supply a meter to every consumer who applies for it. They do not supply any meters to the public lamps. Each company has two stations near to Birmingham. One of them has another station seven miles away from Birmingham. There is competition through all the streets. My evidence as to the price of coal, and so on, applies to both the companies equally. For a large consumption, the charge is 3s. per 1000 feet, and to small consumers, 4s. per 1000 feet, with 5 per cent. off; that is, 2s. 10d. is the minimum price, and 3s. 9d. is the maximum price.

By Mr. DENISON: The companies pay the utmost dividend which the Act allows. One company pays 10 per cent., free of income-tax, and the other pays 9 per cent. They are limited by their recent Act to a lower dividend, in consequence of having capitalized profits in previous years. I cannot say whether they have been earning more than 10 per cent., and applying it to increasing their works, or to a reserve-fund; but they do pay that dividend.

Cross-examined by Mr. HOPE SCOTT: I think for about seven or eight years, their prices have been what I have now stated. They were agreed

prices; the competition between them is the same now as ever it has been—that is, competition for consumers, but not competition in price, the price being agreed. A portion of the gas is supplied a distance of eight or nine miles for a portion of the year—that is, a portion of the gas is drawn from the West Bromwich works to supply Birmingham, and that has to travel a distance of seven or eight miles; but if you take a circle round each of the works, it will leave a distance of five miles to the extreme limit. I am speaking of one company which has three stations; and I say that, if you take a circle round each of those three stations, the extreme limit of supply would be about five miles. The population is not very dense, except in the centre of the town. I cannot tell the rent produced per mile of main. Under some circumstances, gas is sent as far as seven or eight miles. I have tested the pressure. I do not find that, at the end of eight miles, the pressure diminishes very much; I only find that it diminishes in proportion to the consumption taken off it. If you take the consumption off in the middle, you diminish it at the end; but if you have not taken this very large consumption off the middle, you do not diminish it. There is no point in the course of the seven miles at which I would say, without reference to the consumption, that there is a difference in the pressure, except where the altitude varies. There is no difference whatever at a distance of three miles from what you would find at a distance of six or eight miles, or at the works. The pressure at the works, is a pressure equal thoughout the mains. When I pass from the mains to the service-pipes, I find no difference of pressure, except that which is due to the consumption taken off. A long narrow supply-pipe, passing for half a mile, would have at the extremity the same pressure as there is in the main, when there is no supply going on. The question of supply will affect all those different pipes equally. I do not know that at Birmingham the commercial is greater than the lighting consumption, taken as a whole; but there are some manufacturers who consume more for manufacturing purposes than for lighting purposes. The consumption for domestic purposes varies considerably, taken as a whole. I should think the difference between the two would be more than as two-thirds to one-third. The manufacturing consumption depends upon the state of the trade; they work by night in some cases. We make no difference in charge between manufacturing and lighting purposes. I expect that it was the low rate of price which induced the manufacturers to use gas more. People can do without gas, either for lighting or for manufacturing purposes. They have taken to use gas for manufacturing purposes since the commencement. In Birmingham, the price of coke is about 15s. per ton. It exceeds that sometimes. I have known it as high as 18s. and £1. I may have known it above £1 for a short time, or for some particular kind of coke. Different kinds of coke are used, and a larger price is given for one than for another; but the price of coke, from the larger-priced coal, is greater than that from the cheaper-priced coal. That kind of coal is used at Birmingham which, having regard to the illuminating power of the gas, will yield the largest return in the price for coke. The price of a ton of coal, yielding 18s. for a ton of coke, would be 21s. or 21s. 6d., perhaps—so that, practically, in that case, our coal would only cost us 2s. or 2s. 6d., besides the tar and other products which come into the bargain. In addition to the cost of the coal used for the manufacture of the gas, there is other coal used for heating the retorts, the cost of which is about 7s. a ton. That has no residuum worth anything at all. We burn no coke in the furnaces. The public lamps are calculated to burn 5 feet per hour each lamp; we take it upon 22,000 feet in a year.

By Lord R. CECIL: We use very little cannel coal, and therefore none of my calculations apply to that. Gas in Birmingham is about 11½ candles. The parliamentary limit is 10 sperm candles.

Re-examined by Mr. DENISON: We give more than 10 sperm candles; we have never been so low, that I am aware of. It has always been higher than 10 sperm candles; it is, in fact, usually 12. I took an average of a year, and found that it is something over 11½. It is sometimes as high as 15. When I speak of 10 sperm candles, I mean the parliamentary standard. That was inserted in consequence of the works being contiguous to the South Staffordshire coal-field, which yields a poor gas; it was thought right not to compel the company to use coal from a great distance in order to bring up their illuminating power. The company have themselves, to the satisfaction of their consumers, gone beyond Staffordshire to get the South Yorkshire coal, and have raised the gas from 10 to between 12 and 15 sperm candles, although coke has been sometimes as high as 18s. or 20s. a ton. Its average price is 15s. It is sometimes sold higher than 15s. to small customers; to large customers it is sold lower than 15s. It is the 18s. a ton coal which produced the 15s. worth of coke; besides that, we have the 7s. a ton coal to burn for the retorts. It has been a rule, without an exception, that our profits have always increased as the rate has been reduced. I recollect the price being 10s. per 1000 feet in Birmingham, with coal at 7s. a ton, and labour at 20 per cent. less than at present; and the company could then only pay 6 per cent. dividend. They reduced the price to the present figure, and now pay 10 per cent. dividend, the price of labour having increased from 21s. to 28s. a week.

Lord R. CECIL: I understand the result of your evidence to be that, from your experience, the raw material never exceeds 2s. per ton in excess of the products?

Witness: In my long experience, the raw material rarely or never exceeds 2s. per ton in excess of the residual products. I do not make in that any calculation of the coal required to heat the retorts. The date of our last diminution of price is eight or nine years ago. I think it has now attained its limit. I do not anticipate that, if we lowered the price of gas indefinitely, the dividend would rise indefinitely. To carbonize a ton of coal, there is required about 5 cwt. of coal at 7s. About a fourth of the total consumed for gas purposes is the quantity of coal required for the retorts. Every one, I think, who has a chance of consuming gas, consumes it now in Birmingham; the consumption has increased very fast indeed. We have no hope of carrying it further, except by an increase of the population, and except, also, that it is continually being introduced for new processes in manufactures. We have not so large a class of very small consumers as in some towns. Taking Edinburgh or Glasgow, we have not so many small consumers as they have; the very poor do not use it so extensively in Birmingham as in some towns. There are not a great many under £1 a year rental. We furnish them with meters free of charge; there is no rent whatever for them. We do not take security. If a consumer does not pay, we have charged the in-coming tenant. It is not now our practice to do so. We do not put the house which has not paid into a black book. It was the practice, some years ago, to make the landlord give security for future payment in respect of those premises, but I believe that that is discontinued by both companies now. I think that they mutually agreed to assist each other to recover the rents, as far as they could; but they do not refuse to light a house, unless they discover that there has been some fraud: they may then do so. If we found that the meter had been tampered with, we should take the parties before the magistrates. If a consumer supplied by our company thinks that he is charged more than is right, I am not aware that he has any remedy, except having the meter tested. He makes application to the company to test the meter; that is not very often done. It is very seldom indeed that there are complaints from consumers of any description brought before the board. We use the water-meters; they are high-spouted meters. At present we are using low-spouted. Any new meters which I have put in are low-spouted. In any of the streets of Birmingham, where a consumer has occasion to complain of one company, or thinks himself hardly used, he has no difficulty at all in applying to the other company; that prevails generally throughout Birmingham and the district. If one customer has a ground of complaint, he applies to the other company, and 48 hours' notice is given, and then a change takes place. We have had a great many changes of that kind.

Robert Dundas Thompson, Esq., M.D., examined by Mr. DENISON.

I am a member of the College of Physicians, and a Fellow of the Royal Societies, both of London and Edinburgh. I am now the medical officer of health of the parish of Marylebone, and also lecturer on chemistry at St. Thomas's. I have paid much attention to the analyses of gas and coal. The coal which is calculated to make gas free from sulphur compounds is the cannel coal. A little of that is used in London, but the great bulk of the gas made in London is not from that coal. The coal used for making London gas contains a great deal of sulphur in various forms. I believe the reason that sulphurous coal is used in making gas in London, instead of cannel, is this—that it gives a larger amount of coke, whereas the cannel coal gives an inferior coke. I have compared the illuminating power of the London gas generally with the Scotch gas—taking Glasgow, for instance. One of the best modes of measuring the value of gas is, to determine how long a certain portion of gas will last, with a flame of a certain height, under a certain pressure. I find that a cubic foot of gas made from cannel coal would last 100 minutes, passing through an aperture of about one-thirtieth of an inch, with a flame of four inches in height; whereas I have often found gas, under the same circumstances, last only 60 minutes. That would be the gas made from common coal. I find a great deal of hydrogen in the London gas; that has no illuminating power. I have a complete analysis of some London gas. I find the quantity of olefiant gas from 3 to 4½ per cent.; carburetted hydrogen, about 40 per cent.; hydrogen, from 46 to 50 per cent.; carbonic acid, ·46 per cent.—that was about the average of one company's gas; carbonic oxide, 5·6 per cent.; nitrogen, about 2¼ per cent.

By Lord R. CECIL: The illuminating elements of these are the olefiant and the carburetted hydrogen.

By Mr. DENISON: The rest do good sometimes, by diffusing the vapour of naphtha and the hydrocarbons.

By the CHAIRMAN: I am giving the figures within a range, in some instances. I can give a complete analysis of 100 parts:—Olefiant, 3·86; carburetted hydrogen, 38·93; hydrogen, 46·43; vapour of water, 2·48; carbonic acid, ·46; carbonic oxide, 5·62; nitrogen, 2·22.

By Mr. DENISON: This was ordinary London gas.

By the CHAIRMAN: You are to take that analysis as the average of that particular company. It is about the ordinary average of that company.

By Mr. DENISON: I have other analyses, but they come pretty nearly to this one. In one company I have found 91¼ grains of ammonia in 1000 cubic feet of gas; in another I found 48 grains in 1000 cubic feet; I regard the last as small.

By Lord R. CECIL: The ammonia deteriorates the illuminating power, and I would like to see it entirely expelled from the gas. I think it possible to get rid of it in the manufacture. I do not know how you could take out all traces; there would still be traces of it. Five grains of ammonia in 100 feet is about what is stated in my analysis; that is a good average London gas. I should be satisfied with a gas that contained 5 grains per 100 feet. It could not be brought so low as that by merely passing the gas through water; it would require sulphuric acid for that purpose. It was by means of sulphuric acid that I reduced it to a lower quantity than that.

By Mr. NORTH: That would not be a costly application, because you get a good deal of ammonia by that process, which becomes a commercial article. I know that ammonia in gas is considered by some advantageous, for the sake of neutralizing the sulphurous acid.

By the CHAIRMAN: To a certain extent, I agree with that. If you had a large quantity of sulphurous acid, you ought to have it neutralized.

By Mr. DENISON: As far as 5 grains of ammonia in 100 feet, I make no particular objection; but if it goes beyond that, I do object. I have frequently found it very much above 5 grains in 100 feet. I believe that sulphuretted hydrogen more frequently exists in gas than is generally supposed. The mode of testing it is to apply a piece of sugar of lead paper to a jet of gas issuing with great force. It has been found in volcanoes that you cannot detect sulphuretted hydrogen by means of sugar of lead paper, and yet sulphuretted hydrogen is evolved in very considerable quantities from volcanoes. I believe that the gas must be oxidized, and the sulphuretted hydrogen obtained by a separate process, as sulphuric acid. I have not done that, neither have I adopted some other test; I merely throw this out, from finding that other people have not detected the presence of sulphuretted hydrogen. I have myself found sulphuretted hydrogen existing in great quantities. I have found it for a week—at least 6 days—in one company's gas. It is both deleterious and useless. I have known persons to be affected by it; it can be detected by the smell. I have so detected it; it is the same smell as the smell of putrid eggs and the smell of sewers. I have known considerable expense gone to for the purpose of detecting the cause of the smell, supposed to be from the drains. In one instance, a case of that sort was brought before a magistrate, but nothing came of it. The magistrate dismissed the summons, on the ground that the mischief was over before the summons was heard.

By Lord R. CECIL: Sulphuretted hydrogen will not form in the gas-mains, or the gasometer, from other sulphur compounds; if not made with the gas it will not come.

By Mr. DENISON: I think the Gas Act ought to contain clauses prohibiting the presence of sulphuretted hydrogen; I believe the gas companies would not object to it on sanitary grounds.

By the CHAIRMAN: It gives a very pale blue flame. I would recommend that this sulphuretted hydrogen should be got rid of by a very careful manufacture; I believe its presence is due to carelessness in the manufacture, by not purifying sufficiently.

By Mr. DENISON: I certainly think there ought to be something in the Act which could be enforced by people easily, and without much expense, against the companies, to protect them from sulphuretted hydrogen. I have had experience of the insufficiency of some clauses in public Acts, particularly with regard to water, with respect to remedies of that sort; there is no one to carry out the provisions of the Act, so that the companies may offend against the Act without there being any one to notice it. First of all, there ought to be the clause, and then some one to take the matter up.

By the CHAIRMAN: The mere remedy to the private consumer would not be enough. I find very little bi-sulphide of carbon in gas manufactured from cannel coal. In Newcastle coal there is always a certain quantity. It produces injurious products. It will not only wear away the backs of books, but I believe, from the smell very frequently emitted, different sulphur compounds are produced. Twenty grains of sulphur in 100 feet would be an enormous quantity for cannel coal gas, but for Newcastle coal gas it would not. I would be satisfied with gas made from Newcastle coal which did not go beyond that. The bi-sulphide of carbon cannot be detected by test-paper. I would detect it by oxidizing it, and obtaining it as sulphuric acid. I have subjected the gas of these companies to that test. I have got 9½ grains of bi-sulphide of carbon in 100 cubic feet; that would be about four grains of sulphur in 100 cubic feet. No doubt overheating the coal will produce such a compound. A very great deal depends upon the engineer, with reference to keeping the temperature low.

By Mr. DENISON: I have found the pressure vary considerably in London. Not less than an inch is the proper pressure. I have found it, in the day-time, as low as 3-10ths, and in the night-time, 7-10ths perhaps. I have experimented early in the morning, and at all times. If gas is wanted in the day-time for any purposes, 3-10ths is enough to give a proper light. At the Crystal Palace, gas is used for cooking, and they want a greater pressure than that to use it efficiently for cooking.

By the CHAIRMAN: The leakage is greater when the pressure is high; the escapement is then greater. I believe that is the principal reason why the gas companies reduce the amount of their pressure during the day.

Cross-examined by Mr. Serjeant WRANGHAM: The pressure would vary according to the level. There is a law for that. It would vary according to the composition of the gas; some gas would be lighter than others. It is an approximation to it to say that the pressure is increased the tenth of an inch for each ten feet of rise. Sugar of lead does not detect the presence of sulphuretted hydrogen in the way in which it is commonly applied; it does not detect minute quantities of sulphuretted hydrogen. I do not know as to the quantity, but I know the fact with regard to volcanoes. When the test-paper was put into the vapour issuing from any of the places where vapours escape, the sulphuretted hydrogen was not so detected. There was no effect produced upon the sugar of lead by the vapour. Its presence was ascertained in this way: a celebrated chemist who made the experiment, which was made in Iceland, happened to be smoking a cigar at the time, and he took his cigar, and introduced it into the vapour, and immediately he saw the blue flame of sulphuretted hydrogen. He ascertained also, by experimenting upon a larger scale, that it was sulphuretted hydrogen.

The CHAIRMAN: How do you know that that was the gas that came out of the volcano?

Witness: The chemist who made the experiment determined it to be so.

By Mr. Serjeant WRANGHAM: The detection was made with the lighted end of the cigar; there was a blue flame. Hydrogen itself burns a pale yellow. The result deduced by the chemist, who was Professor Bunsen, of Heidelberg, was—that there was enough of sulphuretted hydrogen in that vapour to take fire, and yet that the paper would not detect it. I do not know that it is laid down in Brande's Chemistry, and works of the same class, that the acetate of lead will detect the presence of sulphuretted hydrogen where it amounts to a twenty-thousandth part of the gas subjected to the test. A twenty-thousandth part would be a considerable amount. There are more delicate tests to apply if you work upon a large scale. Nitrate of silver is a more delicate test; that would be interfered with a good deal by other substances present; you could condense the sulphur and sulphuretted hydrogen with nitrate of silver; you must work upon a greater scale; you must pass a large quantity of gas through a solution. No doubt there are tests capable of discovering even the smallest trace of sulphuretted hydrogen, so that a company, liable to penalties for the presence of sulphuretted hydrogen, might be exposed to those penalties by existing tests of a delicate character being applied—more delicate than the acetate of lead. Anything like ammonia, that dilutes the illuminating power, must act injuriously to it. One process for eliminating ammonia from gas is by means of sulphuric acid. That deteriorates the illuminating power of the gas if the sulphuric acid be strong. It decomposes or condenses a portion of the olefiant gas. That has not been found to be an expensive process, for you get a large quantity of ammonia, in the shape of sulphate of ammonia, which can be sold. Whether the gas, if generally subjected to such a purifier, would cause ammonia to cease to be so valuable, and to become a drug, is a commercial question which I cannot answer.

By Lord R. CECIL: Passing gas through water would generally be found to be a sufficient mode of getting rid of the ammonia; it gets rid of most of the ammonia.

By Mr. Serjeant WRANGHAM: It would be better to remove the quantity of it we find now; the processes are not sufficiently certain. Sometimes, I find a larger quantity of ammonia during the day than at another time; it would be a great matter if the companies could so manufacture the gas as to have a maximum of ammonia.

The CHAIRMAN: Would the water reduce that portion of which we have been speaking—the five grains in 100 feet?

Witness: The example I gave was one in which weak sulphuric acid was employed.

The CHAIRMAN: You think that the water would not remove five grains in 100 feet?

Witness: I have not succeeded in doing it myself.

By Mr. Serjeant WRANGHAM: All the gas in London is passed through water in the first instance, and the larger part of the ammonia is in that way eliminated. Everything that cools the gas has the effect of condensing the vapours. I have no doubt that the temperature of the atmosphere has a considerable effect upon the illuminating power of the gas. Frost would greatly reduce it; but I have not tried the experiment as to what extent the illuminating power would be affected by frost. I believe it would be considerable. I would rather not mention the company alluded to in my analysis, where the 46 per cent. of hydrogen was found. The gas was taken at a considerable distance from the works. I think it as well not to mention the company.

Serjeant WRANGHAM: You need have no delicacy in mentioning the company; and it is rather important to know both where and when the experiment was made.

The CHAIRMAN: I do not know whether the witness is aware that the counsel examining him is here on behalf of the companies; and, if he sees no difficulty in the way, I think the statement should be given. The evidence, indeed, is of little value unless we have the opportunity of testing it.

Serjeant WRANGHAM: I should be glad to have the date of the experiment, and the place where it was made?

Witness: I gave a mean of 46 to 50 per cent. of hydrogen, but that included a number of analyses of different gases, all London gases.

Serjeant WRANGHAM: Was that from 3 to 4½ olefiant gas, 40 per cent. of carburetted hydrogen, 46 to 50 per cent. of hydrogen, 46 per cent. of carbonic acid, 5·6 of carbonic oxide, and nitrogen 2·5—was that the analysis of any particular gas?

Witness: That was an analysis of gas made by the Crystal Palace Company. I have not got any other analysis here. The gas which lasts longest with equal pressure, and with a flame of equal height, is a richer gas than one which lasts a short time, because the best illuminating gases have a high specific gravity. I am not aware, from experiment, that a gas of that rich quality is more or less subject to deterioration by cold than a weaker gas. In the experiments I made, the best gases were from cannel coal, and the worst was a mixture of cannel coal with Newcastle coal. I did not try as to which of those two gases was most affected by the atmosphere; I therefore cannot give any information upon that.

The CHAIRMAN: Do you feel sure of the accuracy of your answer, that gas of a high specific gravity is not more liable to be affected by the atmosphere than the lower? Is that your opinion?

Witness: I said, I was not aware of any experiments.

By Serjeant WRANGHAM: A mixture of cannel coal with Newcastle is the mixture generally in use in London. I do not know that gas from pure cannel coal would be a much more costly article for the public. If a certain quantity lasted a longer time than the inferior gas, it would be cheaper. I have calculated that the gas lasted 100 minutes at the price of 4s. 6d. per 1000 cubic feet; and for the other gas, which lasted 60 minutes, the public would pay 7s. 7d. I agree with the evidence given this morning by a gentleman from Birmingham, that the raw material is very little more costly than the residual products which he sells—that is, taking into consideration the coke. No doubt it would make a vast difference in the price to be charged to the public if the price of coal is very high, and the residual products yield little or nothing. All coal-fields are limited; cannel coal is not so much distributed. I am not aware about the prices, or that the use of a particular description of cannel coal, for the purpose of making gas, has raised the price very considerably. I know the Boghead coal very well. I do not know that the raising of the price of that coal from 29s. to 52s. depends upon its being used for gas. It has a very important application besides that; it is very largely used for the manufacture of paraffin oil. It is also very largely used in Edinburgh and Glasgow for making the gas.

The CHAIRMAN: Give us one place where cannel coal only is used, and the gas sold at a low price?

Mr. DENISON: We have had the case of Rochdale, where they give 20 candles.

Re-examined by Mr. DENISON: There are places where they use cannel coal almost entirely for making the gas, and where they sell it at a very low price, giving gas of 20 candles. In the volcano case, the cigar was what we may call the informer about the sulphuretted hydrogen, but the investigation of Professor Bunsen did not depend upon the cigar; he came to the conclusion, beyond any doubt, that sulphuretted hydrogen was there. The only gas of which I can give the actual quantity of hydrogen in London is the Crystal Palace, because the experiments there were made under my own direction. I know, as a fact, that hydrogen is generally largely present in the London gas, and that that must needs be from gas being made as London gas is. It is the case, that the gas of the best illuminating power, being of high specific gravity, quite coincides with that, hydrogen being the lightest of all the gases.

By Lord R. CECIL: It would be difficult to say what is the lowest proportion of sulphuretted hydrogen that is noxious to the system, for what would hurt one person would not hurt another. It is very poisonous to plants. As cannel gas is of a higher illuminating power, we need use a much smaller quantity of it to produce the same light.

Mr. *John Dangerfield*, examined by Mr. DENISON.

I am vestry-clerk of St. Martin's, and have been for twenty years engaged as solicitor to various parochial boards in that parish. I have had during that time to prepare many contracts between the parish and the gas companies. From 1852 to 1859 there have been five of those contracts. It is stipulated generally that a certain amount of light shall be given to the satisfaction of the committee or the surveyor; those used to be the terms. The light was to be tested by the photometer; the later contracts require that it should be tested by the photometer. In the contract of 1859, there is no clause by which, in case the company refuse or decline to light the lamps according to the contract, they are to forfeit a large sum. That clause disappeared out of the contracts last year. That was since the districting. The reason of the absence of that clause was this:—Mr. Andrews, the secretary of the Equitable Gas Company, called upon me in the morning of the day on which the tender was to be considered, and he stated five objections to the form of the former contract; one of these objections applied to the penalty, which was £1000. The consequence was, that the clause disappeared. We had no means whatever of making a contract with any other company as to those particular lamps. Mr. Andrews also objected to the clause which appeared in the previous contracts—in all the contracts, I believe; I know that it is in the four preceding contracts—that the company should indemnify the inhabitants, as well as the vestry, against any loss occasioned by breach of contract on the part of the company; that he objected to. Then he also required that a clause should be inserted in the new contract to protect the company against strikes of workmen. The nature of that clause is this:—"And it is hereby further agreed, that, in case the said company shall be prevented at any time from lighting the said lamps with gas, according to the terms of this contract, by reason of any strike of the workmen of the said company, or their withdrawing themselves from the work thereof, without previous notice to the said company, whereby the said company would be unable to carry out this contract, then the said company shall take every ways and means in their power, and with all convenient speed, for sufficiently lighting the said district, either with gas, oil, or some other sufficient mode of lighting; and the said company shall allow and pay to the said vestry a proportionate sum during such time as the said company shall be prevented from lighting any of the said lamps, either by means of gas or other sufficient mode, as aforesaid, from the last-mentioned cause only." This clause was not in any of our four or five previous contracts. The fourth point was, that the company should have liberty to open the ground at any time they pleased, on giving 24 hours' notice; this was directly contrary to the 109th section of the Metropolitan Local Management Act. They then required that the lamps should be lighted half an hour after sunset; the former contracts were that they should be lighted from sunset to sunrise. In the old contracts they had to begin lighting at sunset. I think now that they are required to begin lighting half an hour before; there was some difference in that respect with regard to half an hour; they may make it half an hour later by commencing earlier. I think. The vestry did not object to those modifications which were proposed by the Equitable Gas Company. Mr. Andrews stated, that those were the terms which would be required by the company; the vestry therefore

submitted to them, having no other company to go to. I told them that it was useless, there being a parliamentary inquiry pending upon the subject, and that this session would originate some measure upon the subject. This contract might be determined in a year, so that they might enter into this contract for that time, and leave it to the Legislature to provide a remedy in future. I told them they were completely in the hands of the company after the districting. After that had been agreed to the contract was sent to the solicitor of the company, and there were some alterations made there. One of these alterations was this: it was to be the same quantity of candles, but the word "average" was inserted in the draft. I would rather leave the practical effect of that word "average" to the gentlemen who are familiar with the subject of gas than explain it myself, but that is the word which the gas company's solicitor insisted upon being inserted. They further required that the company should supply any new service-pipes and repair them, from the bend at the bottom of the lamp-post to the mains; that was a new condition altogether. I opposed it very strongly; I said that it imposed a pecuniary loss upon the vestry, inasmuch as those had been previously borne by the companies. I objected to it on that ground, and also on the ground that Mr. Andrews had not stipulated for that when he called upon me, and they gave it up. They had been in the habit of cleaning the lamps; they do that now the same as before.

Mr. DENISON: Having had this experience of contracts made under competition, and of contracts made after districting, do you think that it is of importance, as you told the vestry the other day, that something should be done by Parliament to give you protection?

Witness: Most decidedly.

Cross-examined by Mr. RICHARDS: I am not here to complain at all, but to give evidence of facts; but when these new terms were imposed upon the vestry, I told the vestry that they were in the hands of one company, from whom there was no appeal, and that they must submit, and leave future legislation as to protection to Parliament. I think that the contracts, as they stand at present, are unfair to this extent, the terms are all new; and, though the companies might have thought them necessary, the vestry did not think them necessary. At the time when the last contract was entered into between the company and the vestry, there had been some very extensive strikes among the London workmen. I certainly think myself, as a matter of opinion, that that clause about the strikes was a fair one to have inserted; I believe it is ordinarily inserted in builders' contracts. I do not complain of that clause; I complain of the clause that the lights should be lighted half an hour after sunset, and be put out half-an-hour before sunrise. I do not know that that is a very great hardship; but I complain of any alteration in a contract which had undergone consideration for many years, and which had been renewed on certain terms. Sunset and sunrise are, no doubt, points of time. I do not know how long it takes to light the lamps. I have not observed that it takes about an hour; I have never followed the lamplighter. I believe now we have them lighted half an hour before sunset; and they may be extinguished, some of them, half an hour before sunrise. The old contract, of the alteration of which I complain, was made on the 11th of October, 1854. There have been several since; 1854 was during the competition. According to the contract of 1854, the company were liable to a penalty for each and every night such light, lanthorn, or lamp should not be lighted one hour after sunset. The contract of 1859 varies, in point of time, from the three or four previous contracts. In taking these contracts together for my evidence, I have merely looked at them where there is a variance. I do not know that there were any other variances than those I have mentioned; but I have the contracts here.

The CHAIRMAN: Will you turn to the one immediately before 1859? What is the stipulation with regard to lighting the public lamps in that contract?

Witness: That is, that they shall light each and every night, from sunset to sunrise, so that all the lamps or lanthorns be lighted within half an hour after sunset.

Mr. RICHARDS: Now, will you turn to the contract of 1854?

Witness: That they shall light "from sunset to sunrise, so that all the lamps or lanthorns be lighted within half an hour after sunset."

The CHAIRMAN: What is the variation of the last contract of 1859 from previous contracts before the districting, with regard to this lighting of the public lamps?

Witness: The contract of 1859 says—"The said company commencing to light the said several lamps and lanthorns half an hour before sunset, and completing the lighting thereof half an hour after sunset, and commencing to extinguish the said lights half an hour before sunrise."

The CHAIRMAN: What is the substantial difference between that and the terms of the contract of 1854?

Witness: I do not say there is any material difference. I was only mentioning that that is one of the stipulations which Mr. Andrews made; what importance he attaches to it I do not know.

Mr. RICHARDS: What is the change?

Witness: I have stated it, I think. I do not say that there is any material difference; we did not consider that it was so important as for us to make any demur to it. I only tell you, that that was one of the alterations. In the contract of 1854, there is nothing about extinguishing. In that contract of 1854, there is the following attachment of penalties in the sixth folio—"And that the said company and their successors shall and will forfeit and pay to the said committee and their successors, for the time being, the sum of 1s. 6d. for every such public lanthorn or lamp, within the jurisdiction aforesaid, so directed or appointed by the said committee or their successors, for the time being, to be lighted as aforesaid, for each and every night such lanthorn or lamp shall not be lighted within one hour after sunset." Practically, the penalties were not incurred unless they were lighted an hour after sunset. I do not consider that the parish has been suffering under any grievance from alteration in the contract of 1859 from the contract of 1854; I am not aware of it. I have already said, that they stipulated that the company should be at liberty to open the ground on 24 hours' notice. In cases of emergency it is certainly not unreasonable that the company have an opportunity of immediately opening the ground within 24 hours, for the sake of the public, and the Statute provides for cases of emergency; but the clause which they required to be inserted was for all cases, irrespective of emergency, and the Statute requires that the consent of the vestry should be required previous to opening the ground for any new mains. This clause gives permission to open the ground for that purpose, or for any other purposes. If the Act is positive, it can be overridden by the contract. There are some cases where it may be doubtful whether they are cases of emergency or not. I do not recollect, at this moment, any cases occurring in which, while the company conceived them to be cases of emergency, the vestry has refused power to open the ground. I may say that, since I have sat at the vestry as clerk to the board, no such case has occurred; that has only been for the last four or five years, since the Metropolitan Management Act. The company would apply to the surveyor; I think the surveyor is the person who gives or refuses permission. The vestry would stand by the surveyor, as a general rule. I do not recollect even hearing of the case of two public-houses, in which the publicans ran away, and the men in possession were continuing burning the gas of the company, upon which the company applied to the board for permission to open the ground to cut the gas off, and the surveyor refused the permission. There may have been such a case. The following letter, dated the 13th of June, 1859, was signed by me:—

I am desired by the vestry of this parish to forward you the accompanying resolution, passed by the vestry, in reference to the breaking up of the carriage and footways by gas and water companies, viz.—"That no opening be allowed to be made by the gas or water companies, except after the full notice required by law;" and to request that directions may be given to the officers of your company, that the notices for breaking up the paving may be given in accordance with the resolution of the vestry.

Those are matters rather for the surveyor; I am merely here to state the effect of the contract. I decidedly think that this resolution—"That no opening shall be allowed to be made by the gas or water companies"—would not include cases of emergency. That must be read in connexion with the Statute, which makes an exception in favour of cases of emergency. The new contract of 1859 was made in September. The contract was made three months after the resolution was passed. I do not know, but it is not unreasonable to suppose, that the stipulation in the contract was introduced in consequence of that resolution of the vestry.

By the CHAIRMAN: I think that any stipulation which might be inserted in the contract would over-ride the provisions of the general Act, where it is a provision in which the parties contracting are alone interested. Suppose that an Act gives protection or privileges to particular parties, and those two parties contract with each other, I think that they may make a contract, though contrary to the provision made in the statute, which would be binding upon them both, if they made no such contract. In a question with regard to opening a public road, I think that a stipulation inserted in a contract between our vestry and the gas company, would supersede the operation of any provision upon the subject in the general Act, for this reason, that the provisions of the Act are, for instance, that the public roads should not be opened without the consent of the vestry; therefore, if the vestry gives that consent beforehand, it would be consistent with the Act of Parliament.

By Mr. RICHARDS: In the case of laying new mains under the Metropolitan Local Management Act, I believe the vestry have the absolute power of entirely refusing the company. The words are these:—"And no gas-light company shall, at any time, break up or open any such pavement, surface, or soil, for the purpose of laying down any new mains of pipes, without the consent in writing of the said vestry or district board; and every company or person offending against this enactment, shall, for every such offence, forfeit a sum not exceeding £5." As to old mains, there is a stipulation of three days' notice. The resolution passed by the vestry on the 13th of June, 1859, had not any reference to new mains at all; because, in that case, the Act prohibits the ground being opened, except with the consent of the vestry. In the other case, a notice of three days is required; therefore, they were driven before that contract to comply with the Act of Parliament by giving three days' notice. The only object of the letter was to say that the Act of Parliament must be complied with. No doubt it was some breach of the practice that occasioned the letter to be written.

Re-examined by Mr. DENISON: The Metropolitan Local Management Act gives power to open the street in cases of emergency in less than three days, but, in all case for the specific purposes mentioned in the Act, it is on three days' notice. I presume that, in the case of the public houses which has been mentioned, three days' notice would have been sufficient to enable them to cut off the supply. If that was a case of emergency, I think it was already provided for by the Act. I presume, that those concerned in preparing and passing the Metropolitan Local Management Act knew that such cases did occur as companies wanting to cut off the supply of gas. The introduction of the following words into the contract—"A light equal on the average to the light produced by a certain number of candles," was an interpolation by the company. In 1854, there was a penalty of £1000 if the company did not perform certain things, but that was not inserted in 1859. In the contract of 1854 also, there was a provision that the company should indemnify all the inhabitants against damages, and so on; but that was omitted at Mr. Andrews' suggestion. Whether my construction of the law about a contract over-riding the statute be right or not, I presume the company thought that they would get something by that contract professing to override the statute. As the Legislature has given power to the vestry to consent, it seems to me that that is consistent with the Act. The company, acting by their solicitor, certainly stipulated to have that power of over-riding the Act of Parliament.

By the CHAIRMAN: I am the legal adviser of the vestry. I have never given a moment's attention to the question, whether the insertion of a consent in the contract will satisfy the requirements of a clause in an Act of Parliament requiring the consent of the vestry to be given to the opening of a road. We have no competing company whatever, and it was of no use our objecting to it; it therefore was submitted to. I have been a little mistaken in its being supposed that I attached any importance to the question about sunset and sunrise—it is merely a verbal alteration; but Mr. Andrews required that that alteration should take place, and the vestry submitted.

The CHAIRMAN: I ask you, as a legal authority in the parish, whether, in your opinion, the vestry, having made a contract, part of which contract was that the gas company should have the power without giving notice, and without anything further being done by the vestry, of opening the ground; those words give the consent which by the clause is required to be given by the vestry?

Witness: If you take the latter part of the clause, with regard to opening for new mains, that is a matter which is left entirely for the vestry to consent to or refuse.

The CHAIRMAN: Do you think that, when your vestry made a contract, in which contract there are words giving power to the gas company to open the ground for a main without any notice, that is to be considered such a consent of the vestry as is pointed out in the clause which has just been read?

Witness: I think so.

The CHAIRMAN: Do you think that the terms of a contract, such as you have read, in truth over-ride that clause of the Act of Parliament?

Witness: I think so, so far as the power of the board extended. So far as they have powers on the subject, they may relinquish them by doing that which would waive any notice required by the Act of Parliament. In a particular case of necessity they may waive the objection. Here we considered ourselves tied hand and foot, and we submitted.

By Mr. DENISON: I would regard the contract as the written consent, and was so treated by the vestry.

Serjeant WRANGHAM: As to the penalty clause, was it by common con-

sent that, in the contract of 1859, this arbitration clause was inserted instead:—"Lastly, it is hereby expressly declared and agreed, that if any dispute shall arise upon the terms and conditions of this contract, or the construction of any matter, clause, or thing therein contained, the same shall be referred to arbitration, in manner provided in the clause relating to arbitration in the Companies' Clauses Consolidation Act, 1845?"

Witness: It may have been so; I do not think that is in the contract of 1854. I see that it is not in the contract of 1858. The contract of 1858 was not before the districting. In the 1859 contract there is an arbitration clause inserted in place of the penalty clause; I think that that clause was not substituted for the penalty clause by common consent. I do not think that there was any discussion about it.

By Mr. DENISON: I have no recollection of any discussion about it. Why it was put in I do not know. I see, on looking at the draft, that those words appear to have been put in by the solicitor for the company. I said, "It is of very little use arguing with you as to your alterations. You have the power of dictating. We have no appeal." Therefore they altered as they pleased, and we had to agree to it, except with regard to the bend, and as to repairs.

Serjeant WRANGHAM: Though you had no remedy they conceded that to you.

Witness: Yes.

Serjeant WRANGHAM: The word "average" was objected to; I find that the word "average" is, in this clause,—"to produce and deliver, during the time when the said lamps or lanthorns shall be lighted as aforesaid with gas, a light equal on the average to the light produced by not less than eight parliamentary candles, each of such parliamentary candles to consume 120 grains of sperm per hour; the said company commencing to light the said several lamps and lanthorns half an hour before sunset, and completing the lighting thereof half an hour after sunset, and commencing to extinguish the said lights half an hour before sunrise." Is that the clause where the word "average" is introduced?

Witness: Yes.

Serjeant WRANGHAM: Do not you find the word "average" in the Sheffield Gas Act, which is the model one on the other side—"Provided always such fixed price shall not exceed 35s. 2d. a year for every such lamp or burner burning" so and so, "and consuming, on an 'average,' 4 cubic feet of gas per hour?"

Witness: That may be so

The CHAIRMAN: Yes, but it is very differently applied.

Mr. *Charles Lahee*, examined by Mr. DENISON.

I am vestry-clerk of St. Luke's, Chelsea. In June, 1858, our vestry passed a resolution directing our surveyor to get evidence about the consumption of gas in our parish. I have a report of the results of that investigation. Those results have already been given by Mr. Hughes. It was reported to us, having regard to the quantity of gas consumed, according to the pressures taken; and, allowing for cleaning and so on, there ought to have been paid for the gas supplied to the public lamps £3. 4s. per annum. The contract price that was paid was £4. 10s. I account for the difference by the diminution in the quantity consumed. It was ascertained that the quantity had been short of the contract. In November, 1858, we had a letter from the secretary of the London Gas Company, Mr Hinde. In consequence of ascertaining the difference, we had required them to deduct £400 from the amount of the bill delivered. Mr. Hinde's letter had reference to that. It was dated "25th November, 1858. Dear Sir,—The directors are much disappointed that their applications, both verbally and by letter, for payment of the account for two quarters' lighting the public lamps in Chelsea parish, due to this company at Michaelmas last, have not yet been complied with. They are naturally very desirous of preserving the best understanding with the vestry, and trust that nothing will interrupt it. The payment of this account, however, has been so long delayed, and without reasonable cause, that the directors have no alternative than to give the vestry notice that, unless the amount—namely, £1514. 9s. 4d.—is paid within fourteen days from this date, they will be reluctantly compelled to place the matter in the hands of their solicitor to enforce payment, and take such other measures as they may be advised." In consequence of that letter, we made a tender to Mr. Hinde of the amount, less the £400. The claim was for £1500 and odd at that time; subsequently, another quarter was included. £1514 was claimed, and we tendered £1100. We informed him that that was founded upon experiments which we had actually made. I have our letter in reply to that one of his; it was to the effect I have mentioned. The contract quantity was 5 cubic feet an hour. It turned out that they had actually supplied 3·49 feet. We furnished Mr. Hinde with all the necessary details of our experiments, and he disputed the accuracy of them.

Serjeant WRANGHAM: Do you know, of your own knowledge, that 3·49 was the amount actually supplied?

Witness: That was the report made to me by persons who were directed to make the experiments.

Serjeant WRANGHAM said, he thought the committee would agree with him that this evidence was inadmissible. It was not the result of the witness's own observations, but of a report made to him by a third person. He would not, however, object, if he had an assurance from the other side that that third person should be called.

Mr. DENISON said, if it was insisted upon he would produce that person; but it was usual in taking the evidence of a public officer, to admit his statements as to what had been done under his directions.

Serjeant WRANGHAM said it was usual, in the case of a man of science or an engineer, to allow him to give evidence of the result of investigations made by himself and his assistants; but this gentleman, who was merely the vestry-clerk, was making statements as to a scientific investigation.

The CHAIRMAN: Of course we cannot upon this evidence assume that the real amount supplied was 3·49 feet; but the witness is giving evidence of something done by his directions, upon which certain correspondence arose.

Serjeant WRANGHAM: I am anxious only that the committee should not conclude that this was the actual quantity given.

The CHAIRMAN: I hope you all understand that we are not sitting here in judgment upon the gas companies. We do not put parties upon strict proof, nor is it necessary. We are sitting here to investigate a matter of public interest, and whether in this particular case it was 3 or 4 feet, is a matter of indifference to us. All we know is, that this gentleman, representing certain other gentlemen in Chelsea, states that a certain amount of gas was to be supplied, and that it was not equal to what it should be.

Serjeant WRANGHAM: But that is what I object to. It is simply evidence that he received a report.

The CHAIRMAN: And in that sense we take it.

Mr. DENISON: It is evident that there has been a dispute between the vestry of Chelsea and the company, and these experiments grew out of it.

Examination continued: Mr. Hinde thought that our experiments did not justify the course adopted by the vestry. I do not think, he said that he had made any counter experiments of his own, or that he was able to prove that he had given the proper quantity of gas. I wrote to him on the 8th of December. He did not answer it. The next step was the writ. I do not know the date of the issue of the writ. It was after December, 1858, some time in January, 1859, I think. I do not think I had any personal communication with Mr. Hinde between the sending of my letter and the issue of the writ. Before January, 1859, another quarter had become due. We were then advised to make a tender of £1800 for the whole amount. That would be £1800, including the previous £1100. They demanded from us in all £2292. Soon after the action was brought, the company determined the contract. That was on the 30th of June, 1859. Soon after we had to make a new one; the terms were different; they demanded the same price, but upon conditions diffirent in some respects. I have here the draft contract submitted by the company to the vestry. It contains clauses to override the 109th section of the Metropolis Local Management Act, the breaking-up clause; and our solicitors were instructed to say that the clause was unnecessary, as the 109th section of that Act provided for it; it was, therefore, returned to the company's solicitor, and they wrote upon it—"The clause should stand; it gives permission to the company to lay mains, &c., wherever the Act referred to states that gas companies are not to lay new mains without the consent of the vestry." The next alteration is with regard to fixing lamps a distance from the mains of the company. The contract was, "To light or lay down any mains or pipes for the supply of gas, for the purpose of lighting any new or additional public lamps at a greater distance than 65 yards from the mains." The vestry thought it ought to be 80 yards, and the company considered 70 yards sufficient. We consented to the 70 yards. The next clause the vestry objected to altogether, and they struck out the whole of it. There was a difference between us and the company as to the time of lighting and extinguishing. We proposed half an hour before the time; it was modified to 40 instead of 45 minutes. They wanted 45 minutes after sunset, and we wanted to give them only 30 minutes. They proposed that the lamps should continue lighted till sunrise, or till 40 minutes before sunrise. We do not appear to have said anything about sunrise. There was only 10 minutes difference between us. The former contract ran from actual sunset to actual sunrise. I have drawn up a comparison between the instructions given by the London Gas Company to their lamplighters, with reference to lighting and extinguishing the public lamps in Chelsea, and the old contract time of sunset and sunrise for nine months, ending December, 1858, and it works out 282½ hours each; and on the 687 lamps it is 970,500 cubic feet.

By the COMMITTEE: The instruction to extinguish on the 3rd of April was at five o'clock in the morning. We found that sunrise on that day was at 34 minutes past five, so that the gain to the company was 34 minutes, and that, carried through the whole nine months, gives an amount of 282 hours and 30 minutes per lamp in favour of the company. Multiplying the 282 hours by the 687 lamps, at 5 cubic feet an hour, and 4s. 6d. per 1000 feet, comes out to £218 7s. 3d. for the nine months.

By Mr. DENISON: With regard to the illuminating power, the contract originally stood that the gas should "give a clear, white, and brilliant light, according to the true meaning of this contract." We propose to insert—"And, as regards its illuminating power, to be such that each burner or flame of the said lamps should be equal to the light of 12 sperm candles of six in the pound, each burning 120 grains per hour; the gas so to be supplied shall be free from ammonia, bi-sulphide of carbon, sulphuretted hydrogen, and other agents deteriorating its quality or its illuminating capacity." The company's solicitors wrote to say, "The company decline to agree to the insertion of these conditions;" and the contract went on, that each of the bat's-wing burners was to consume, "on an average, taking such average from the whole number of burners, and during the whole time of lighting, at the rate of five cubic feet of gas per hour, at the least." It appeared by that, that it would be necessary to test the consumption every hour of every night in the year, in order to detect an error. We proposed to make it "five cubic feet per hour at the least for every hour during the night;" but the company's solicitors said, "The vestry are aware that these terms, as altered by them, cannot be complied with." The consequence was, the contract never went on.

The CHAIRMAN: It is not worth while to go into these minute particulars.

Examination continued: We have no contract with the company now. They continue to light the lamps, and they have sent in their bill. The quarterly accounts formerly were £777; but at December, 1859, the quarter's account was £1217. 11s. 4d., and for the quarter ending March 31, 1860, it was £1139. Before the districting took place, the Imperial Company lighted the greater part of the parish with good gas at £4. 10s. per lamp, and the London Company lighted the Hans Town district at £3. 10s. per lamp. That contract was entered into in 1851. After the districting, they raised the price to £4. 10s. all over the parish; so that the loss on the Hans Town contract was £173 a year. My estimate of the deficiency of supply in the whole parish is between £800 and £900.

Mr. DENISON read the judgment of the Court of Common Pleas on the demurrer of the company to the pleas of the parish in the action brought for the recovery of the amount due to the company under the contract; and, in reply to further questions,

Witness said: The result of that judgment is against the parish, so far as it has gone; and we have no means of having the question tried, as to whether the company have supplied the full quantity of gas or not.

Cross-examined by Serjeant WRANGHAM: The only decision of a court of law has been to over-rule our demurrer. Previous to the districting, the Imperial Company lighted the larger portion of the parish; the London lighted the Hans Town district, and the Western the outlying district of Kensal Town. The London lighted at a lower rate than the Imperial. The date of their contract was 1851. I think they were not then fighting their way into the parish. I do not know whether they were then charging more to private consumers than for the public lamps. There has been a dispute between us and the company, and we have offered them £1800 in place of £2200 odd. They determined the contract in June last year, after the litigation had commenced between us. The new draft contract was drawn up by them, and altered by the solicitor of the vestry. We objected to the breaking-up clause. There was a similar clause in the contract of 1858, but the vestry wished to have it struck out. As to the distance of the public lamps, the company inserted 65 yards in the draft; our solicitor suggested 80 yards, and the company consented to 70, so that there was a difference of 10 yards between us. As to the time of lighting, the company wished to have a margin of 45 minutes, and our first proposal was to make it 30. I do not know that it was afterwards agreed to take 40, because the contract has never been settled. There was no further objection on that alteration being made.

The CHAIRMAN: I think we fully understand that.

Cross-examination continued: The clause respecting the illuminating power and purity was put in by the vestry; it was not in the old contract. It was suggested by Mr. Hughes, who was consulted by the vestry, but the company declined to insert it. There was a dispute between us as to the mode of ascertaining the consumption; the company wished to have it 5 feet on the average, and we wished it to be 5 feet per hour at each lamp. If that had been done, it appears to me that one hour's observation would have detected whether 5 feet were consumed or not; but by their proposal it would have been necessary to have a continuous observation, all the time the lamps were burning throughout the year, to get the average.

Serjeant WRANGHAM; But would not the quantity have varied as the pressure varied?

The CHAIRMAN: What he means is, that, if you take it at an average of the whole of the burners, you must have tested the whole of the burners.

Witness: If we tested one lamp by our plan, and it fell short of 5 feet, we should think it would have been a breach of contract.

The CHAIRMAN: You are asking him for an explanation, and that is really what he means.

Cross-examination continued: I do not go to the extent of saying that, if any one lamp, in any one hour, burnt 4 feet 8 inches, the whole contract would be at an end, and that the company could not recover against us upon that contract. Now that the contract is at an end, they go on lighting us as they do other customers. I do not know from the account whether they charge at so much per lamp, or so much per 1000 feet. I had better read what the bill they have sent in states:—"To gas supplied to 690 public lights from the 30th of September to the 31st of December, and to one lamp from the 11th of November to date, £1060. 15s. 6d.; lamplighters' wages, £126. 15s.; repairs, £30. 0s. 10d.; giving for the quarter £1217. 11s. 4d." I only know, from the letter which accompanied the account, that they charge for the quantity of gas supplied.

The CHAIRMAN: It is a matter of perfect indifference to us whether it is one way or the other. I cannot see where you are driving.

Serjeant WRANGHAM: I will just state what I think will throw a little light upon it.

The CHAIRMAN: We are in a state of profound darkness at present.

Serjeant WRANGHAM: I want to show that the winter quarters, charged by quantity, would be very much heavier than the summer quarters; whereas, under the contract, they would pay a uniform price all the year round.

The CHAIRMAN: We cannot judge, on the one side or the other, whether too little or too much is charged.

Serjeant WRANGHAM: It is quite obvious the intention is to compare these two charges with the quarterly charges under the contract, which would be very much less, because in the winter quarters twice as much gas is consumed as in the summer.

Cross-examination continued: Under the contract, the vestry paid an equal sum quarterly. The charge by quantity would be much heavier in the winter than in the summer. Assuming the number of lamps to be the same as in their account, and supposing the whole to be burning 5 feet an hour, I make the amount for the last two quarters £1842. 0s. 1d., instead of £2290. 19s. 1d. During the winter quarter, no doubt, the consumption is more than double, but we have never paid in that way.

Re-examined by Mr. DENISON: Whether this is right or wrong, we have no means of ascertaining whether they are charging for the actual quantity supplied or not. According to this paper, they are charging us for more than 5 feet an hour. Assuming that every lamp is burning its proper quantity, the account comes to more than £400 more than the proper amount. Besides that, when we made experiments, we found the lamps burnt less than 4 feet, instead of 5 feet; so that there would be a deficiency of something like twice £400. At the time the Imperial Company were charging £4. 10s. for our public lamps: it was many years ago, when the price of gas was higher. The clause in the contract of 1858, giving the company the power of breaking up the streets, and thus repealing the Metropolis Local Management Act, was made after the districting. The figures I gave as to the putting out of the lamps, were made out from the company's instructions; and, comparing them with the actual time of sunrise, I took no observations about the time of lighting the gas. Assuming that the company took the same margin that they were taking in extinguishing the lamps, that would just double the figures, and, instead of £218, we should have £436 in excess. We consulted Mr. Hughes before asking for the clause about a light equal to 12 sperm candles. Mr. Hughes had been advising the vestry for some time prior to that. Mr. Hughes told us that 12 sperm candles was the usual thing now put into Acts of Parliament. It seems to me desirable that there should be some means of securing that every public lamp should burn the proper quantity, and that there should be a penalty if it does not. We ought to have the means of testing every lamp by itself. Of course, if it burns badly one hour we should claim the penalty. In the other case, we have no means whatever of ascertaining whether there is a deficiency under the contract. When I said the contract would be broken, I mean, so far as to render the company liable to the penalty for that one lamp. I do not claim that the whole contract should be broken because one lamp was deficient in light. We want the means of securing that each lamp burns the proper quantity.

FRIDAY, MAY 25.

Mr. DENISON said he hoped he should be able to finish the case to-day, so far as the promoters of the bill were concerned.

The CHAIRMAN said he should be glad if there was a probability of that being done, that the case would finish before the end of the day, as the committee would like to have a short time for consultation.

Mr. DENISON said there was a mistake in some figures given in Mr. Lahee's evidence, which Mr. Hughes would correct in the course of the day.

Mr. *W. J. Wilde*, examined by Mr. DENISON.

I am proprietor of an hotel in the Haymarket, and have been concerned in the financial management of theatres for some fourteen years. In the early part of 1853, the price at which gas was supplied to the Haymarket Theatre was 4s. per 1000. In January, 1854, we had an intimation that from that period the charge would be 4s. 6d.; at that time the price was raised to theatrical and other large consumers as far as I had an opportunity of inquiring; but my inquiries were chiefly directed to the theatres. I applied to the directors of the London Company who supplied the Haymarket Theatre for a drawback. They were charging 4s. 6d. per 1000 for theatres and large consumers, and I conceived it to be the ordinary custom of trade that a large consumer was supplied under the rate of small consumers. The mode of collecting the accounts in the theatre, I believe, is this, they are collected weekly, the state of the meter is taken weekly, and the sum due is collected within a week; my application was for a drawback or weekly allowance of rebate, because our weekly payments enabled the company to turn over their capital more frequently, and placed us, I believe, in an unfair position, inasmuch as we were large consumers. In 1857, the supply of gas was transferred from the London to the Equitable Company. The London Company sent in an account made up to a certain date, and the Equitable claimed the payment of it. I objected to it, and paid a portion of the account due for the gas. It was in the month of September that the London Company ceased to charge us with gas; from that period the Equitable charged us. After an interview with the secretary, the account subsequent to the period at which the Equitable represented themselves to have supplied us was closed; but I kept open for adjustment a balance of about £29, to meet a claim which I conceived Mr. Buckstone had for compensation. That was in September and October. In those months we had a very insufficient supply of gas, so much so that, at one period, I sent for Mr. Phillips, of the London Gas Company, and told him that unless he could guarantee us a supply of gas, Mr. Buckstone could not open the theatre: they said they would see to it, but after that it was worse than before. That was in September and October, at the time the transfer took place. It was so bad after that, that Mr. Buckstone had to apologize from the stage to the audience. The dispute about the money which I kept back went on with the Equitable Company into the year 1858. Early in the year 1858 I went with Mr. Buckstone's solicitor to the office of the Equitable, with the view of getting the claim adjusted. I was then told by the secretary that it was a matter that must be arranged between the London and the Equitable. I was asked if I would object to meet the representatives of the two companies with a view to an adjustment. I expressed my willingness, but had not an appointment. Some months after this I received a message from the Equitable Company.

The CHAIRMAN: These minute details we do not want; we only want the result.

Examination continued: The result was, I was informed, that unless the claim was paid, subject to some trifling deductions, the gas would be cut off. I paid the claim, because I was advised that the company were not compelled to supply us at all. I was told, at the same time, that if our account got more than one week in arrear, the supply would be cut off. The supply, at the time of the dispute, I should say was as good as it should be. Since then it has become uncertain; one night you will have a very good light, another one not so good.

By the CHAIRMAN: That was up to within two months. It appears now to be very good again.

By Mr. DENISON: I find in my own house that the inequality in the supply of gas occasions a great deal of expense. We are entirely in the hands of the company, as to any deficiency of supply. I have thought, in the theatre, that the meter registered more rapidly than the gas has been consumed; that is, that there has been an increase in the registration. In my own establishment I have found a large increase in the quarterly bills, for which I am unable to account.

By the CHAIRMAN: I judge of the quantity, by the increase of the bill. I do not know anything more as to the amount of the consumption, except taking it from the meter.

By Mr. DENISON: I do not think we have consumed more gas; our requirements have not been greater. I am not so well able to assert that that is the case with regard to the theatre, because there are so many varying demands for gas; sometimes there will be much more consumed that at other times. I am speaking chiefly of my own house, because there the demand is steady; almost unvarying. The money got from the theatre for the supply of gas, is a pretty steady return, as far as the Haymarket Theatre goes. The gas was laid for the first time in 1843, and during the whole of that period from 1843 till now, the gas companies have never lost a penny by supplying the theatre; they have got their returns weekly.

By Mr. PACKE: When the transfer from the London to the Equitable took place, the charge was the same, 4s. 6d.

Cross-examined by Mr. RICHARDS: Since 1843 the payments of the theatre have been weekly; we may have paid on account. I do not think it is desirable for us to have to pay weekly; it would be very desirable to have that capital in hand. We do not make all our payments weekly. At the time the alteration in the price of gas took place in 1834, the London and Equitable Companies had mains in the Haymarket—very likely the Chartered and Western Companies had mains there also. I do not think there was any competition at that time. The districting took place in 1857. I do not thinkwe had the option of two companies up to that period, because when I made inquiries as to the practice with other theatres, I found that the theatres supplied by other companies had been charged at a higher rate; there was a simultaneous movement, therefore I do not think there was competition. We had not a drawback from the gas company always. The reason I applied for the drawback was this: I considered when we were supplied at 4s., and other consumers at 4s. 6d., the 4s. was a kind of reduction to large consumers. When we were placed in price on an equality with the small consumers, I thought that we were entitled to a drawback. It would not be a matter of contract whether we were to have a drawback. The charge of 4s. 6d. was compulsory upon us, and the application for a drawback was made upon the same principle as I should go upon in paying an account, and asking for a discount for prompt payment. I thought that we were entitled to an equivalent for paying more rapidly, because the smaller consumer has three months' credit, and a month allowed for collection. I did not complain of the quality of the gas in September, 1857, but of the quantity, or the amount of light. I do not know whether that was gas supplied by the London Company; I do not know at what period the transfer took place exactly; it lies between the new and the old company. I believe the custom of theatres is to pay for their gas one a week.

Mr. RICHARDS called the chairman's attention to the last answer.

The CHAIRMAN said he thought it was of very little consequence whether the committee heard it or not. It was of very little importance whether other theatres paid weekly; all that the witness proved was that he felt they were entitled to a drawback because they paid weekly, whereas other consumers paid perhaps every three months.

Mr. RICHARDS said he thought it proved that theatres were not very good pay.

The CHAIRMAN said there was no complaint against the company for demanding weekly payment; witness only said, as they did charge the theatres weekly they were entitled to the drawback.

Re-examined by Mr. DENISON: In 1854, there was a simultaneous movement with the gas companies to raise the price to the theatres; therefore, we knew it was no use applying to the other company for a supply.

By Mr. RICHARDS: I am speaking of the result of my inquiries amongst different theatres supplied by different companies; this intimation of a rise was conveyed simultaneously to them.

By the CHAIRMAN: It was a rise to theatres only.

Antonio Panizzi, Esq., examined by Mr. DENISON.

I am principal librarian of the British Museum. A great deal of gas is burnt there. The company who supplies it is the Imperial. I have had cause of complaint against that company for charging me more than my neighbours. The case was this: when the British Museum was enlarged, 16 more lamps were wanted, and I told the trustees that those 16 additional lamps would cost £84 at five guineas a lamp per year. One of the trustees said "You pay too much." I said "I do not understand the value of gas, but I am paying what was charged before." He told me, "If you inquire, you will find that you pay too much." I then inquired what the parish paid for the public lamps, because our lamps are exactly the same, and are lighted at the same time by one of the men who light the public lamps, and they are put out at the same time? I found that the parish paid £5 only. I wrote to the inspector of the company, who, I was told, was the proper officer, but he never answered my letter. Then I wrote to the secretary of the company, and he wrote to me, saying that the parish paid £3000 a year, and the Museum under £200 a year, and that was the explanation of their charging five guineas to us and £5 to the parish. I did not think that that was a good reason. I have the letter, which I can produce if the committee desire. Our lamps are of the nature of public lamps standing outside the building, with nothing but the gilt railings between them and the streets. In 1857, there was a cellar which was attached to my house, which was so bad on account of the damp that it could not be used, it was suggested that if a jet of gas was put there it would prevent the inconvenience, and the cellar might be rendered available. The inspector of the company was spoken to by our clerk of the works, and he said the charge would be about two guineas a year. I then asked Mr. Braidwood to come and see whether it was safe to put a light there, though it was out of the house, and he said it was perfectly safe. It was put there, but it did not serve the purpose for which it was intended, so that the cellar was abandoned and another cellar substituted, where it was necessary to put the gas and exactly the same jet of gas was put. When the bill came in, I saw they had charged six guineas a year, and I spoke to the inspector about it, and I told him to see what the quantity of gas was which was consumed there. I told him that it was certainly less than the quantity consumed by one of the public lamps, and that it was only during the winter months, say eight months in the year. He went and looked, and came back to me and said, "Certainly an allowance would be made." When the collector came to be paid, he asked for the six guineas. I told him what the inspector had said, and he said that the inspector had no right to say so. I then sent to the company's offices, and they said the inspector had no right to say so. I could not help myself, and I paid; but I had a meter put on, and the gas has been measured since, and the average consumption is 1500 cubic feet a month; and, therefore, instead of six guineas a year, the utmost would not have been a half of that, about 53s. or 54s. I wrote to the company informing them of these facts, and telling that in future they should not charge more, and moreover that they ought to pay back what had been overcharged, and they have written a letter, which I will produce if you please, in which they say that if there has been any overcharge, they will see to it.

Mr. RICHARDS: Will you have the kindness to produce that letter?

Witness: This is it:—

I am favoured with your letter of the 19th, and beg to say, that when the contract was entered into with the clerk of the works to supply a gaslight to be burnt night and day in the cellar in your house for six guineas per annum, the company thought they had made almost a nominal charge, as they conceived that a considerable quantity of gas would necessarily be required to dry the cellar and keep it aired; if, however, you think that a very small light only, such as you now use, was burnt during the whole of the time, we shall be happy to make the proportionate reduction; the contract is for one of the largest sized burners.

There is no possibility of mistake; their own inspector came and saw the jet of light, and there has never been any light but that the inspector saw when it was put on. The inspector said that a reasonable deduction would be made.

By the CHAIRMAN: The payment of six guineas was not made after the receipt of that letter; I had not measured it then, but when I made the last payment, I had a meter put on, and when I found the result, I wrote to the company and received this answer. I do not know whether the six guineas were paid in 1858; we pay whenever they choose to come; they never wait a minute for their money.

By Mr. DENISON: Having made a six guinea payment upon a two guinea estimate, I got a meter and found that the proper price would have been 53s. I then wrote a letter to them, and got this answer on the 23rd of this month, while this committee was sitting.

Mr. RICHARDS: When did you write the letter which elicited this answer?

Witness: On the 19th.

Mr. RICHARDS: You could not get an answer before the letter was written, could you?

Witness: I wrote on the 19th.

Mr. RICHARDS: The insinuation is, that this letter was written by the company because the committee were sitting. Your contract was in point of fact for a burner to burn night and day in your cellar, a batswing burner was it not?

Witness: No; it is for a jet of gas, and it is so called in the correspondence.

Mr. RICHARDS: Have you the contract with you?

Witness: We never made a contract in writing. I never signed a contract. I will show the letter that I wrote, and the answer. The inspector saw the jet.

Mr. HENRY (secretary to the Imperial Company), said there was a contract and the clerk of the works should produce it.

Mr. RICHARDS: If you name what is the sum you think should be allowed, the company will pay it.

Mr. DENISON: I have no doubt they will, and a bonus of £50 beside. You see there will be no deduction required for the future, because he burns by meter.

Cross-examined by Mr. RICHARDS: The remonstrance I made was when they claimed payment of the first six guineas, which is some time ago, and then it was that I received the answer that the inspector had no business to say that an allowance would be made, and I had to pay. I thought it was unjust, and I had a meter put up, when I found by that that I had been overcharged. I wrote on the 19th of this month and got that answer. I remonstrated with the collector as to the first payment, and I sent one of the clerks to remonstrate at the office. I do not know whether, in accordance with the terms of the letter I have read, I shall receive any deduction. I am certain the trustees want only what is fair. I do not know the Company; I know the trustees. The light was not got originally for the purpose of drying the cellar, but for the purpose of rendering it available. The cellar was already in use, but it spoilt everything; and I was told that, in order to keep wine there, if there was a jet of gas there, it might do; but it did not do. It spoilt everything because it was too damp; therefore my object was to dry it. The whole of the lamps of the Museum, which are more than 50, are charged five guineas a lamp. It was on adding 16 lamps that I had to state to the trustees in the estimates that the gas would cost 84 guineas more per year; they said, what I have stated, that they thought it was too much, and that made me inquire what the parish paid. I do not know what was the price at that time which the private consumers were paying. I only know that the lamps in the streets are like ours, and that they charge £5 for those lamps, which I considered ought to be the charge to us. I believe the parish contract is for 3000 lamps; and I think it is levying a fine on the poor man if a large consumer is to be supplied on better terms than a small one; I do not think it right to make such a difference.

Re-examined by Mr. DENISON: Ours is a public institution, and our lamps are of the same nature as the public lamps. The company knew that a small light only was burning in my cellar, for their own man had seen it. That jet is a perfectly distinct thing from a batswing boiler: it is only a sort of pin-hole. They had the means of seeing it while it was burning, and had seen it.

By the CHAIRMAN: We do not use gas in the interior of the Museum; these are lamps all round the Museum. I think, we have a right to expect, that these lamps should be charged on the same footing as the public lamps on the outside of the gilt railings and in the open street.

Samuel Hughes, Esq., recalled, and examined by Mr. DENISON.

In the answers given by Mr. Lahee at the last meeting of the committee, there is an apparent difference in the figures in reference to the accounts for gas supplied in the Chelsea parish, for the quarters ending December to March last. I did not furnish Mr. Lahee with the figures upon which his answer was based. That answer is based upon a comparison of what they paid before with the present charge; the figures with which I furnished Mr. Lahee, gave a comparison between what was actually charged and what it ought to be according to the number of lamps and the number of hours they were burning. I should explain, that the account which Mr. Lahee gave me, is the charge for the Chelsea parish; this is the bill sent in by the London Company. I find that 690 lamps are charged for the quarter ending the 31st of December 1859, and that 692 lamps are charged for the quarter ending lady-day 1860, the total charge made for those two quarters for that number of lamps is £2359. 3s. 3d. I proceeded to check the charge in the way I took the whole number of lamps charged for the December quarter 1859, and the number of lamps charged for the Lady-day quarter of 1860. I calculated the number of hours each of those lamps burnt, and I put the proportionate charge, estimating the price at £4. 10s., which was the previous contract price, in the way, 690 lamps at £4. 10s. for the whole year amounts to £3105, which less lighting, extinguishing, cleaning, and repairing at 15s., that amounting to £517. 10s., gives £2587. 10s. for gas alone, then I find that the hours from sunset to sunrise in the Christmas quarter at 31·8 per cent. of those in the whole year; then £2587. 10s. at 31·8 per cent. is £822. 16s. 6d. for the gas alone; to that I add one quarters' lighting, cleaning, &c. £129. 7s. 6d., making a total for that quarter of £952. 4s. for the Christmas quarter. That is the price which would have been paid to the company according to their own contract for the number of hours during which the gas was actually burnt. Then the calculation for the Lady-day quarter of 1860 is 692 lamps for the whole year, at £4. 10s., making £3114, less lighting, cleaning, extinguishing, and repairing, &c., at 15s. as before, £519 remainder, for gas alone £2595. Then, in that Lady-day quarter, the dark hours from sunset to sunrise are 29·2 per cent. of those in the whole year; therefore, the £2595 at 29·2 per cent. gives £757. 14s. 10d. Then, one quarter's lighting, cleaning, extinguishing, &c., is £129. 7s. 6d., making a total for that quarter of £887. 2s. 4d. Then, I add gas by meter, as charged in the company's account, £1. 17s. 9d. I also add an extra lamp from the 11th of November, 16s., and the total is £1842, instead of £2359, the amount made out by the company. Mr. Lahee's calculation would have come to twice £777 for the two quarters, supposing each consumed the same, but there was a difference.

By Mr. RICHARDS: These are my own calculations, made upon the principles which I have explained.

Mr. *A. Kintrea*, examined by Mr. DENISON.

I am one of the managers of the Camberwell public lights, and a member of the vestry there. That parish has petitioned in favour of this bill. I was at one time a member of the committee of delegates for managing this business, but I am not at this moment. The Phœnix and the South Metropolitan are the companies with which we have had to deal; they divide the district between them. I am deputed, on behalf of the vestry, to say here that they would be quite satisfied with the protective clauses in the bill as it now stands, but if those clauses are varied as against the consumer, —for instance, if the price of gas is raised from 4s. to 4s. 6d. per 1000 feet, or if the illuminating power is reduced from 12 to 10 sperm candles,—we shall object to the districting. When I say 12 sperm candles, I mean that that should be the minimum. Of course, if it is to be the minimum, 13 or more must be aimed at. By experience, I know that we get more than that on an average from the South Metropolitan Company. We made an application to the Phœnix Company for a reduction; we asked to be reduced to the same price as at Lambeth. I have not the answer here which we received from the company; our vestry-clerk has all the papers with him, but it was an answer of a peculiarly offensive kind, and we did not get the reduction that we asked. The public lights have been raised and then lowered again within the last few years, but they have not been reduced to the amount which was charged to us while free competition existed. I think that 4s., the price which is named in the bill, is a fair price for a large supply of gas. I say that, founding my remark upon the experience of what was charged when competition was going on. I have investigated the accounts of the Commercial Gas Company to some extent, and I am acquainted with their district, my attention having been called to their charging only 4s. per 1000 feet. The district they supply is a very poor one to a large extent. They pay 6 per cent. dividend, and reserve some surplus, too. The South Metropolitan Company paid 6 per cent. when they were charging 4s.; that is one reason why I think they can afford to give us the gas at that price now. Their rental has greatly increased since they charged 4s., and the cost of making the gas per £1000 of rental has greatly decreased. They pay 9 per cent. now, or nearly, having laid out a large sum out of their revenue in creating new works. Camberwell is rapidly rising in population, and I am quite sure it would pay a company to supply gas there at 4s. per 1000 feet, and that they would earn large profits from the increase of supply. At the time the districting took place, it was represented that a great deal would be saved in leakage. In the case of the South Metropolitan Company, the saving in leakage has been 12 per cent. That is a further reason why they should reduce the price; we were told

that we should get the whole advantage arising from the saving of leakage, but we have not.

By the CHAIRMAN: The saving to them by the districting is that fewer mains are required.

Cross-examined by Mr. RICHARDS: I learned that the South Metropolitan Company had saved 12 per cent. from a high officer of the company; I think he is the manager of the lights. In the Camberwell district, all the vestrymen are managers of the public lights. I am not more so than anybody else. I, in common with many other gentlemen, hold the office. It is not a scattered rural district; except towards Dulwich, a large portion of it is crowded.

Mr. RICHARDS: As to this "peculiarly offensive" letter, did it not state that while this parliamentary inquiry was going on, no alteration of any sort could be made in the price of gas?

Witness: That was the answer in one letter; but the last letter was a mere quotation of our letter to them without a single word of comment of their own.

Mr. RICHARDS: What was the offensive part, the quotation of your letter?

Witness: Yes; and disdaining to give a single word of their own in explanation.

Mr. RICHARDS: They had previously told you that while the parliamentary inquiry was going on, no alteration would be made in the price?

Witness: At the same time they reduced the price to Newington in our own streets. Some portions of our streets are in Newington; the other portions being in Camberwell. While this inquiry has been going on, they have reduced the price to Newington to £4. 9s., and they have reduced the price in Lambeth to £4. 10s., but they charge us £4. 17s. 6*d*.

Mr. RICHARDS: You have given us very decided opinions with reference to the price at which gas is made and so on; pray have you ever managed any gas works?

Witness: I am not a gas engineer; I have not been engaged in the manufacture of gas.

Mr. RICHARDS: You have been in the soap business?

Witness: I was at one time, and was a large consumer of gas. I have hadno more opportunity of acquiring a knowledge of the manufacture of gas than an ordinary consumer has. [In answer to further questions, Witness said.] I was one of the delegates. Camberwell has not contributed to the fund for the promotion of this Bill, but on a recommendation of mine I believe that there will be a contribution. I do not think we should much care about an opinion having been given that it is illegal to do so. We should not bother much about it; we will give the money no doubt. At present, we have not done so, and the reason is that it is necessary to rescind a resolution of my own some time ago, that we should not give any. The contribution of the vestry will come out of the rates. I have never given anything towards this agitation privately. Whatever sum we give, will be partly out of my pocket as a ratepayer.

Mr. RICHARDS: And partly out of the gas company's pocket as well as yours.

Re-examined by Mr. DENISON: We shall take our chance of anybody finding fault with it. We have a very decided aversion to districting, and we can only consent to districting on the ground that we are to get some great advantage by conceding it. There is one great objection which we make to districting—namely, that it has placed us under the hands of the Phœnix Company. In a certain portion of the district they charge 7s. 6d. more than in the South Metropolitan district. That is an illustration of what they may do. (Addressing the Chairman): I am here to say that we have a decided aversion to districting.

The CHAIRMAN: O, yes; that I can see.

The "peculiarly offensive letters" referred to by the witness were produced; they were as follows:—

Phœnix Gaslight and Coke Company. Office, Bankside, S.E. March 8, 1860.

Gentlemen,—I have submitted to the board of directors your letters of 29th ult. and 1st inst., requesting a reduction in the present price of £4. 17s. 6d. for the public lamps.

In reply, I am directed to remind you that during the existence of a contract (which you deem binding as *against* the company) it is not usual to make any alteration as in *favour* of the parish. This board, however, being anxious to give you satisfaction, would not be rigid in that matter. But at the present time the whole subject of public and private lighting is before Parliament, and it would be impossible to make any alteration until it has been ascertained what the extent of the legislation may be.

The board do not deem 4s. 6d. a high price for private lighting at present; and the alteration of the French Tariff will still further enhance the price of coals and freights. The lamps are nearly all of the usual distance apart, and it is not probable that you will increase their number without putting the company to a fresh outlay of capital for new mains in new roads. The contract price for the adjoining parts is about the same as yours. This price is not at the rate 4s. 6d. per 1000.

The board feel that the interests of their proprietary are best studied by the company fulfilling their duties to the public. These they consider consist of supplying an abundance of pure gas, of high illuminating power, through just measures, at a low price. I am gentlemen, your obedient servant,

CHARLES PRIDDEN, Secretary.

The Vestry of Camberwell.

Phœnix Gaslight and Coke Company. Office, Bankside, S.E. March 29, 1860.

Gentlemen,—I have submitted to the board of directors your letter of 23rd inst., in which you state "that the present time" (when Parliament has under its consideration the proper price to be charged for public lamps) "is a peculiarly fitting time for this company to gracefully yield to your desire for a reduction." I have the honour to be, gentlemen, your obedient servant,

CHARLES PRIDDEN, Secretary.

The Vestry of Camberwell.

Witness: That was considered extremely offensive to a public board.

Mr. DENISON said he had intended to call the vestry-clerk.

Lord R. CECIL: We will take your word, Mr. Denison, that the vestry-clerk objects.

Mr. *W. E. Greenwell*, examined by Mr. DENISON.

I am the Vestry-clerk of St. Marylebone. Before the year 1852 the Chartered Company supplied the public lamps in a small portion of the parish, at £3. 11s. per lamp, burning four feet of gas per hour. Contemplating the determination of that contract, we advertised in 1851 for tenders, and received one from the Equitable Company to light the lamps in that portion of the parish at £3. per lamp, burning the same number of feet per hour. We made a contract with them on that footing for three years, renewable for a further similar term. We exercised that power of renewal, and the contract expired in 1857. We then communicated with the Equitable Company as to a fresh contract; but they had then made arrangements which prevented their entering into one. We then made a contract with the Chartered Company. The price which they demanded was £3. 10s. per lamp, each to give a light equal to eight sperm candles. I do not think there was any difference between that and four feet an hour. That contract was for three years, and it expires next December. In 1859, we made a contract with the Imperial Company for another portion of the parish, at the same price that we had previously paid—viz., £3. 11s. per lamp, less 5 per cent., each lamp burning 4 feet per hour. The arrangements of the gas companies prevent any arrangement being made, except on such terms as the companies think fit. There are the alternatives of having no light at all or burning naphtha, or of a new company coming into the parish

Cross-examined by Mr. RICHARDS: I do not know that there is about one new gas company projected every year. I know very little about the arrangements of the new company. There was a company projected about two years ago. I think I heard something about that company being revived at the beginning of this year. The larger portion of Marylebone has never had any other company in it but the Imperial. The Equitable and Chartered Companies light a small portion along Oxford Street and a few adjacent streets. In that district, there are 267 lights; the Imperial Company light upwards of 3000. There has never been any competition in the part lighted by the Imperial. I have heard that, at one time, there was very active competition between the Imperial and London in the adjoining parish of St. Pancras. I think the charge of the Imperial in Marylebone, where they have the monopoly, has always been as low or lower as that charged in St. Pancras, where there is competition. I am not aware that the price to private consumers has ever been higher. I cannot answer the question whether in St. Marylebone the price for the public lamps has ever been so much per 1000 feet as to private consumers. That is a matter of calculation as to what the price of gas is, with which I am not acquainted. Assuming that the contract is performed, I have no doubt it is a less charge. Whether, on the whole, in the parish of Marylebone, the Imperial Company have got on pretty well, you must form your own opinion. I stated that the contract price was £3. 11s., less 5 per cent.; but, in fact, the contract is rather different: the contract is £4. 8s. 6d., less 5 per cent., for 4 feet per hour, but with a provision that in case the new pipes of any other company for the supply of gas shall be laid down at the end of the year, then a return shall be made by the parish of the difference between £4. 8s. 6d. less 5 per cent. and £3. 11s. less 5 per cent. The difference is returned, so that practically the parish have paid what I stated, but that is hardly the terms of the contract. This is not a new condition; it has been in the contract since 1851. The company gave no notice that they proposed to introduce some such clause at the time of the entry upon the contract of 1848, three years before. Originally the Imperial was the first company that laid down pipes in that part of the parish. A clause was inserted in the contract, making it renewable for 20 years, every three years, provided no other company lighted the parish. That clause was inserted in the year 1848, and upon the next contract being entered into, the clause, which I have lastly alluded to, was inserted.

Mr. RICHARDS: Was not that clause introduced because the parish wished to introduce another company, which other company were to have the private lighting?

Witness: I cannot tell the motive exactly; that was not the motive of the vestry in acceding to the clause. There was some discussion in the vestry about admitting the pipes of another company in the district which the Imperial lighted. That is the private lighting district. It was stated on one side, that the new company would only light places that were profitable to them, but the vestry did not admit the company, so that nothing came of it.

Re-examined by Mr. DENISON: I am not competent to give an opinion upon the question of the comparative price of the public and private lamps. There may be means which engineers use to ascertain the quantity which the public lamps are burning, but I am not a competent party to give an opinion upon it.

The CHAIRMAN (to Mr. Denison): Are you going to call another vestry-clerk?

Mr. DENISON: No sir. Though by not doing so, I dare say, I shall disappoint many of them.

The CHAIRMAN: I hope you bear in mind, that the whole of our inquiry is prospective. No doubt every one of the circumstances which have been stated before us, are capable of a great deal of explanation, if we were to enter into them; we cannot, therefore, accept them as concluding the question. They show simply what clearly may be done, and, as you allege, has been done.

Mr. DENISON. That is the object I had in view in callling these witnesses.

Lord R. CECIL: We are not sitting in judgment upon the companies in any way.

Mr. *S. Wilkinson*, examined by Mr. DENISON.

I am the Town-clerk of Walsall. The gas works there belong to the corporation, and these additional members elected being part of an adjoining parish. The price of gas is now upon a graduated scale, 3s. 4d. to consumers who burn less than 25,000 cubic feet; from 25 to 100,000 it is 3s. and upwards; of 100,000 it is 2s. 10d. The public lights are charged £3 a year, which includes everything. We do not use much of the Staffordshire coal, but the South Yorkshire and Stavely. The Yorkshire coal costs us 13s. 6d. per ton, and the Stavely, 11s. The residual products realize about one-half; taking the average of the last three years it is about 50 or 51 per cent. In 1857, the capital of the works stood at £14,000. The profit in that year, without deducting anything for depreciation was 16½ per cent, and the price of gas then was 4s. 8d. In 1858, the profit was about 17 per cent, still reckoning nothing for depreciation. In 1859, it had sunk to 14 per cent, the cause of which was that for three quarters of that year the price was reduced to the graduated scale. That reduction of price has been in action more than a year, but we have had no year yet that it has covered. The capital in 1859 was £18,000. Fourteen years ago, we had to pull down all the works, and we have since been gradually increasing them.

By Mr. TURNER: I cannot tell what the illuminating power of our gas is.

Cross-examined by Mr. RICHARDS: There is competition at Walsall now. The reduction I spoke of took place a year and a half ago. It was partly the result of a new company being formed. The residual products yielding about 50 per cent., make our Yorkshire coal cost us 6s. 9d., and the Stavely 4s. 9d. per ton. We sell the whole of our coke, and carbonize with an inferior coal, which we give 10s. and 10s. 6d. a ton for. I presume, it is cheaper to carbonize with coal. I cannot tell the rate of wages. I suppose that would be a material point in the cost of gas, as in every manufactured article.

By Mr. DENISON: Wages at Walsall would be, I should think, pretty much the same as at Birmingham.

By the CHAIRMAN: The competing company, which has recently started, is one of the Birmingham companies.

At a subsequent period, witness was recalled, and, in reply to Mr. DENISON, said: I was asked if the great reduction at Walsall was in consequence of the new company being started? I said it was; I should have added, that the reduction would ultimately have been made; the new company only occasioned it to be made somewhat earlier; that was the only influence it had.

Mr. *Alfred Watson*, examined by Mr. DENISON.

I am the gas manager at the Olympic Theatre. We burn about 34,000 feet of gas per week. The managers of the theatre are Mr. Robson and Mr. Emden; neither of them is able to come here. We have often had to complain of the badness of the gas; on one or two occasions the theatre was left nearly in darkness, and an appeal had to be made to the audience. The manager at one time spoke about supplying naphtha lamps. I am the person who tests the pressure. Some time ago it was very unequal; I cannot tell what it was. The table handed to me is of my own making. I see from it, that in May last year, the pressure varied from 10-10ths to 22-10ths and 32-10ths. I think the pressure at the inlet should be 12-10ths, and at the outlet 10-10ths, allowing 2-10ths to work the meter. I have made frequent complaints to the company about this variation of pressure, as it is very inconvenient in a theatre.

By the CHAIRMAN: The inconvenience of the irregularity of pressure is this:—At the beginning of the evening, the pressure may be down, perhaps, to 9-10ths or 8-10ths; the lights are set to that. Then, when the pressure comes on full, we directly find the gas going to waste; we have to keep a watch on it. I complain of the irregularities of the pressure.

Cross-examined by Mr. RICHARDS: We light up before dark now, before the generality of the shops are lighted, but the lights are turned down until half-past seven. I do not know that that is before the generality of customers require their lights in the shops. A regular pressure of 10-10ths on the outlet is quite sufficient. We have been left nearly in darkness at times. That was not when Mr. Robson was entering the gloomy cell of Erebus; we do not play that sort of thing at our theatre. The whole of the supply passes through the meter. We have the power of regulating the pressure at the meter by a turncock.

Re-examined by Mr. DENISON: We do not want to be regulating the pressure all night. The time that we had to make the complaint was before Christmas. I believe it was the same time that Mr. Buckstone made the complaint.

By Lord R. CECIL: There is no contrivance for the self-regulation of the gas if you have not the pressure; there are valves inside to regulate high pressure.

Mr. DENISON: Now, Sir, though I shall disappoint many persons whom I might call, I think I have given you enough evidence in support of this bill; and, as you wished us to conclude before the end of the day, I shall now close my case.

Mr. RICHARDS said he wished to mention that he had in his hand the contract made with Mr. Panizzi, which was signed by William Denison, clerk of the works. It was for one light, and the description of it was No. 6, which he should be able to prove was the largest burner supplied.

The CHAIRMAN: That is in reference to what Mr. Panizzi said, that it was a "jet."

Mr. RICHARDS said the contract was counter-signed by Mr. Panizzi, who wrote that he hoped it would only be required for a short time.

The CHAIRMAN: I do not know how we can take that.

Mr. RICHARDS said it would come in evidence; he should have put it in Mr. Panizzi's hands if it had been here at the time.

The CHAIRMAN: It would be advisable that we should have some understanding as to the course now to be pursued by the gas companies. The committee propose to adjourn to Monday week at twelve o'clock, and then I suppose the gentlemen who represent the companies will desire to begin their case. I think it would be a very convenient thing if we could receive some sort of intimation of the course of proceedings and the nature of their evidence, and something like an idea how many witnesses they are likely to produce.

Mr. BURKE: I think I shall be able to give you an answer as to a great portion of the inquiry. As regards the rest, it would be impossible, because the evidence depends upon the course of the inquiry. But with reference to our course of proceedings, subject to the approval of the committee, and to the approval of my learned friends on the other side, we think we shall be able to marshal our case in such a manner, as to bring the principal points in difference between us, separately under the decision of the committee. It has appeared to us during the inquiry, that the evidence has been, to a certain extent, discursive, embracing all the different subjects at one time. Without committing my learned friends on this side in any manner, I will state that I myself concur in a great deal that has fallen from Mr. Denison in his opening, namely, that there have been meetings between the parties, and efforts among them to settle a bill which should be satisfactory to all parties. We have never admitted for a moment the fact that the bill was necessary; we have, on the contrary, constantly contended that there is no case for the bill, because there has been no misfeasance on the part of the companies, in the fulfilment of their Acts of Parliament; on the other hand, I am ready to admit that there is not a uniformity of legislation; and inasmuch as at all events there is a suspicion on the other side that the companies may not act fairly towards the public, we have been prepared unquestionably to remove that suspicion, and to adopt uniformity of legislation to all parties in the metropolis, and we have so far endeavoured to frame a bill, or to agree in the provisions of a bill, satisfactory to the public and ourselves. Some features in that bill we have agreed upon; I do not deny that. There seems to be a general acquiescence on the part of all parties, that districting is a proper thing to be done; in our interviews with Sir George Lewis, he distinctly stated that it was the right thing to be done. It will strike all parties that the employment of a double capital to attain one object, and the constant breaking up of the streets, and double pipes, must necessitate a useless outlay, so that it is manifest that districting is the right thing to be done. There seems to be an acquiescence upon that point in all the evidence which has been given, and there is not any difference upon it between my learned friend and me. Taking that as the standard of the bill, we should be prepared to concede various matters upon which it is not necessary now to trouble the committtee. There are some Acts of Parliament of recent origin, and some of much later date. We believe that, as regards those of recent origin, they contained almost all the provisions which the public require. They have had very careful consideration at the hands of Parliament recently, and that upon the opposition of vestries. I speak particularly with reference to the Act of one company, which I am more acquainted with than the others; I mean the Imperial. In 1854, they came with a bill for increasing their capital, and on that occasion the vestry of Marylebone, who are promoters of this bill before you, were active parties opposing that bill. They were then represented by Lord Llanover, who took a most active part in it. There were various meetings between the vestry and the company and Lord Llanover, and at last the bill was settled in such a form, to the satisfaction of the vestry, who were complaining parties, that they absolutely sent one vestryman to give evidence in support of the bill; therefore, we are not otherwise than justified in stating that, inasmuch as the recent parliamentary inquiry cannot show that we have infringed a single clause of the obligation imposed upon us, there is no necessity, as regards those companies who have come under recent legislation, for any fresh legislation. Last year only, a similar opposition took place, in reference to the City of London Company. They were here in Parliament, and then the Corporation of London were their opponents, and an inquiry took place in both Houses of Parliament upon their bill. We should certainly contend, that, for the most part, the provisions of those recent Acts of Parliament are all-sufficient. Then comes the question of the applicability of those Acts to all the companies who are not now subject to those recent provisions. I think I may say, on behalf of the companies for whom I appear, that they would concur in those provisions which Parliament has thought necessary to impose in recent Acts of Parliament. But then come some matters in which we are divided *toto cœlo*, in which we see efforts on the part of the promoters to benefit themselves largely at our expense, by reducing the price of our gas, which was sanctioned only recently, and upon the faith of which our capital was subscribed, by the reduction of our dividends, by reducing the price of our gas, at the same time increasing the illuminating power, all to their benefit, which matters I have a great deal to say about. We shall not trouble you at great length upon the meter question, because we consider that a great deal has been said *in invidium*, which we could rebut satisfactorily; but, in truth, Parliament has dealt with that subject last year; and when it was sought to be represented to you that the companies had persisted in resisting the Act of last year, in order to have the control of their own meters, let me observe this, that the obligations sought to be imposed in this bill for the first time on the companies is, that they should provide meters for the future; whereas, heretofore, we have said the public should provide them. Then, when the bill was before Parliament last year, I can undertake to say, of my own knowledge, that they aided Lord Redesdale in passing that bill, to the best of their power, in order to secure that there should be an Act that would put an end for the future to any of those disputes about meters, and to those unworthy suspicions raised against the companies.

The CHAIRMAN: I do not think we entertain that opinion; on the contrary, I know personally that the companies did assist in the passing of that Act.

Mr. BURKE: I am obliged to you, sir, for stating that; I can say, of my own knowledge, that it was so, because I was employed professionally.

The CHAIRMAN: The principal allegation against that bill is its inoperativeness, for want of means to pay the expenses.

Mr. BURKE: It is not inoperative as regards the standard of measurement. However that may be, whatever legislation should take place in respect to that matter, would be in the shape of an amendment to that Act. That is a subject *per se*, and with that we should not think it necessary to trouble you, if the opinion of the committee should be that the question of meters would be dealt with by that Act. Otherwise, if we have to go into that question, it would require a large body of evidence, in order to show you in what respects the Act is perfect or imperfect. Those who act with me, have been under the impression that that would not be a subject of inquiry before the committee; but that, on the contrary, it was a subject of inquiry on the Government bill, and that it would be unusual, by means of a private bill like this, to interfere with the Act of last year. But that is subject to your direction. We must take our instructions from you; if there is any desire on the part of the committee to enter upon it, we must frame our case accordingly; but we should consider that the meter question is a question, if not settled, to be settled under the meter Act. The other questions would resolve themselves into the illuminating power, the pressure, and the price, and the provisions in the bill with reference to penalties to be imposed; and as regards the tribunal, and other minor matters, which, I think, would not occupy the attention of the committee at great length. We should think that it would be consistent with your convenience, and with the best understanding of the case, that we should divide our evidence upon those several points. Suppose I called the secretary of a gas company, or any official person connected with a company, to deal with the question of the price, I should not deal with other matters at the same time with him, but confine the inquiry to the price, and call other witnesses as regards the price, and then leave that question in the hands of the committee. Then I should take another point, and call witnesses upon that point, and so marshal our evidence that the committee would be able to come to a satisfactory conclusion upon each of the points in succession. There is not the slightest interest on our parts to protract the proceedings; and all I can say is, that if we got what we considered a fair and satisfactory bill, there would not be the slightest desire on the part of the companies to impede its passage.

Lord R. CECIL: In what order do you propose to take the questions of the pressure, the price, and the illuminating power?

Mr. BURKE: I have not consulted my clients upon that; I am answering the hononourable charirman off-hand.

The CHAIRMAN: At the same time, we should like to take the most intricate ones first.

Mr. DENISON: Will you allow me to remind you, sir, that in opening the case, we had something like a discussion about this, and we seemed to agree that those three points, certainly the price and the illuminating power, were so mixed up together, that you could not possibly separate them; and I was very much struck with what occurred in examining one of the first witnesses. I was asking a question about price, and an honourable member of the committee asked what is the illuminating power? The fact is, you cannot stir an inch in the question about price, without the question of the illuminating power coming in; pressure is connected with it, not so immediately, certainly, but still they must go together very much. Therefore, taking my instructions from what occurred on the first day, I have gone on the principle of principle of putting them together, and I have done so partly on account of this reason, to avoid the inconvenience of the same witness being called three or four times over. I can understand that it is convenient for the parties opposing to have an opportunity of calling a witness three or four times over. On that account, I am not very much surprised at one of my learned friends suggesting that course. I should suggest that, taking those which you said on the first day were the great points, they should be still treated as inseparable as I have treated them; and that when you have heard the case of the companies against the bill, which would be one in substance, having heard the speech of my learned friend, and then the evidence, and then our reply, you should come to such resolution upon the preamble of the bill as you may deem proper, with such resolutions upon those great points as committees are in the habit, very often, of passing when the body of the bill is not involved in the preamble of it. In a railway bill it is not so; when you pass the preamble, it means passing the railway; but here the preamble is nothing without the clauses; and when you have heard the evidence upon the great points, you will be in a condition to pass such resolutions upon the price, the pressure, the illuminating power, and possibly the meters also, as will determine our course in dealing with the clauses afterwards. So far as my learned

friend has made observations upon the bill in general, this is not the time to answer them. I only want to guard the committee against falling into this mistake. At one period of my learned friend's remarks, he said, I apprehend there will be no difference between us upon some points; and one of those points was, that all the companies would be content to take the "recent legislation" as he calls it. We are not disposed to agree with him upon that, because the legislation of the Imperial was in 1854, when competition was actively going on, and the legislation upon the City Gas Company had reference entirely to a different point, namely, to the question whether gas should be made in the City of London at all, the question being a question of nuisance. The price limited in that Act is practically no limitation at all; therefore, it must not be supposed for a moment that we should concur in such a proposal as letting these companies go out of Parliament with no better legislation against them than the legislation of 1854, and that peculiar legislation of 1859. With respect to the districting, I agree with my learned friend, that it is no doubt a convenient thing, but it is equally necessary that it should be under control; the real question is, what amount of control should be provided. The only point will be for the committee to give some directions to my learned friend, whether those points are to be taken together as I have taken them, or whether they shall be split up into a great number of inquiries.

The CHAIRMAN: I hardly think the committee would choose to settle that question, because we are not masters of the nature and the amount of evidence to be adduced; but I think the answer that Mr. Burke gave to the question I put, shows very plainly that he nearly appreciates our present view of the object of our inquiry, and that he will not lead us away by multiplying evidence upon matters upon which small amount of evidence, or none at all, might very well pass. As to the question whether we should take each of those points separately, I think, whatever opinion we might entertain, it would hardly be fair to restrict the counsel appearing for the companies; but I certainly think that it would be a very desirable thing that we should have the evidence marshalled, and have it presented to us separately; at the same time, it would hardly be fair upon the learned counsel to lay that down as a rule; but after what has fallen from the two learned counsel, I think they could pretty well agree as to the best course to adopt for bringing the evidence before us in the most convenient form. It seems to me, that the matter is now very much narrowed. I am glad to hear the way in which the answer has been made to the question of the committee by Mr. Burke. I think he very much understands our views upon the subject. We have nothing to do with the question of crimination of the gas companies; we have no ground to suppose that they have gone beyond the terms of their Acts.

Mr. DENISON: We assume the contrary—that they have been acting contrary to them.

The CHAIRMAN: This bill goes upon the assumption that circumstances have differed since those Acts were granted, and that combination has taken place amongst themselves, which if they had been under control, it is allowed, on both sides, would be beneficial to the public, but that, in consequence of that combination existing without such control, the public stands in need of a certain amount of protection; the question is, in what form the evidence, with respect to the affording of that protection, can be most conveniently marshalled and arranged before us. As we have ten days before we meet again, I cannot but hope that counsel on both sides will be able to come to an arrangement upon the matter, so that as the evidence might be presented to us in the most convenient shape.

Mr. CRIPPS: It may, perhaps, be convenient if I state to the committee, that the separate matter upon which I appear for the Commercial Company, will not take any great amount of evidence or length of time over and above the general case. Though I appear separately for that company, I have thought it would be very inconvenient that there should be two sets of cross-examinations; and inasmuch as my learned friends appear for the larger mass of the companies, I thought it best to leave it in their hands. Possibly that course may still be continued when we come to give our substantive evidence; and then, as to the separate matter, specially relating to the Commercial Company, I think the evidence that I shall have to adduce will be very short, and occupy very little time.

Mr. DENISON: As to our meeting together to arrange the course of the evidence during the holidays, it is not very likely. It would be better, perhaps, if the committee will seriously consider this question before they separate, as to the mode of taking the two cases of the illuminating power and the price. It has occurred to me since I sat down, that there is a case going on at this moment in another committee-room, in which two distinct cases are before the committee in one bill; and the way in which they have been conducted has been this: there has been a distinct inquiry as to the one, which was the Edinburgh case; witnesses have been heard for that, and then witnesses have been heard against it, as if the two cases were in two distinct bills. Then the affirmative case for the second question involved in the bill is to come on after the vacation. We are in this position: we have gone through all our affirmative case, on the assumption that it could not be separated. It having been taken together hitherto, I cannot help thinking that it would save time, and be of advantage to everybody, and also more fair to us, that the whole of their evidence should be brought against us in the same way as as we have brought ours in opening. I think if the committee would come to some resolution, it would be convenient to have it settled whether those great points of the pressure, the illuminating power, and the price, are to be taken together, as we have taken them together, or whether they should be separated.

Mr. BURKE: I can only state, on the part of my clients, that sooner than there should be any complaint on the other side, that by any possible arrangement they would be placed in a position of unfairness, we will adopt my learned friend's view at once, and conduct our case as he has conducted his. We abandon the proposal we have made, and we will call our witnesses, and examine them upon all the points together.

Lord R. CECIL: You understand that we do not enter upon accusations against the companies which have here and there dropped from the witnesses; those have not the slightest influence upon the minds of the committee.

Mr. BURKE: Quite so; I am very glad to hear your lordship say so; at the same time, there has been a good deal of evidence of that kind given.

Mr. PACKE: It has had no effect upon the committee.

Mr. DENISON: I said when I had the opportunity, that I was not bringing it forward in that way, but that it was in order to show what might, and most likely would, happen in the future.

The CHAIRMAN: Supposing it is understood that the evidence which is about to be brought forward on the other side should take the different questions *en masse*, in the same way as it has been presented on the side now finished, let us understand that we shall at once go into those points about the price, the pressure, and the illuminating power, which are agreed to be taken together on the ground alleged by Mr. Denison, that you cannot very well separate them; that we are not to have a mass of other evidence preparatory to getting upon them, but that you will go at once into those points which are the real points.

Mr. BURKE: The committee will do us the justice to believe that we shall not throw away our money, or their valuable time, in prosecuting an inquiry in which there would be no object.

The committee then adjourned to Monday, the 4th of June.

(To be continued.)

Legal Intelligence.

COURT OF BANKRUPTCY.

BASINGHALL STREET, MAY 24.

(Before Mr. Commissioner HOLROYD.)

IN *re* THE BOROUGH OF MARYLEBONE GAS CONSUMERS' COMPANY (LIMITED).

This company was formed with a capital of £200,000 in shares of £1 each. The promoters were persons named Holmes, Howard, and Sutton, who, it was stated, were each to receive £1000 out of the company's funds on certain conditions; and Mr. W. Howard was the secretary of the company.

A petition was then presented by Mr. G. M. Phillips, on behalf of the directors of the company, for a winding-up order. A similar petition was also presented by Mr. James Hepburn, a shareholder, for whom Mr. Brookbanks, instructed by Mr. Jaquet, appeared. This latter petition was unopposed, and the main facts were corroborated by two affidavits. The company was instituted at the close of 1858 for the manufacture and sale of gas in Marylebone. Very little of the capital was paid up. The directors, considering an Act of Parliament indispensable, applied for one. Their first application failed, and their second was withdrawn; therefore, nothing was in reality done with a view to the commencement of the business of the company. The directors owed about £2000, and there were also claims to the amount of an additional £2000 by engineers, parliamentary agents, and others officers.

His HONOUR made an order for winding-up under Hepburn's petition, the costs to be paid out of the assets of the company.

Miscellaneous News.

THE ORIENTAL GAS COMPANY (LIMITED).

The Annual Meeting of Proprietors in this Company was held at the London Tavern, on Tuesday, May 22—Captain JAMES BARBER in the chair.

The notice convening the meeting having been read, the seal of the company was affixed to the register of proprietors.

The following report and statements of account were taken as read:—

Your directors have again the pleasure of submitting their yearly statement of accounts, and of affording information in reference to the proceedings of the company during the past year and its future prospects.

In their last report they stated that estimates had been called for by the Government for lighting Fort William, with its barracks, church, and offices; also other public buildings and churches in Calcutta, and that they were awaiting replies to such estimates from the proper authorities to enable them to carry out the proposed large extensions.

Although more than fourteen months have elapsed since those estimates were sent in, your executive still await the decision of the Government. These delays in carrying out the details of a scheme, which had received the high sanction and approval of the Governor General of India, necessarily defeat the calculations upon which the immediate success of this company was based, and postpone that prosperous state of affairs for which those connected with the undertaking have unceasingly laboured. Notwithstanding these disappointments, the general business of the company has made satisfactory progress, as will be seen from the following statement and working account annexed, viz.

	Public lights.	Private lights.
1858—December	469	1114
1859—January	473	1162
February	497	1248
March	510	
April	541	1345
May	566	1386
June	588	1424
July	596	1467
August	604	1487
September	604	1553
October	604	1597
November	604	1382
December	606	1504

The decrease in the month of November was occasioned through the discontinuance of gas by a large consumer. The monthly gas rental has, however, only suffered a temporary reduction, as the latest advices show an increase of public and private lights for the current year.

The laying of mains in the first section of Calcutta having been completed to the extent of 25 miles, the directors avail themselves of this opportunity of appending a list of the streets in which mains were laid up to 31st December last, [here follows the list.]

The directors have to inform you, that in November last, Mr. George Clark, your superintendent in Calcutta, in reply to a letter urging a better system of conducting his department of the company's business, tendered his resignation, which the board, after due deliberation, accepted. The directors have availed themselves of this vacancy, to make such terms of engagement with his successor, Mr. Wilton, as cannot fail to secure the strictest economy, and promote the best interests of the shareholders.

The directors have also to announce that Messrs. Messenger and Sons' contract for the supply of gas-fittings to the inhabitants of Calcutta, under the patronage of this company, expired in August last. It thereupon became necessay to consider the best means of supplying this want, and after consideration the directors deemed that it would be wise and expedient to take over Messrs. Messenger and Sons' stock, and that the company should add a gas-fitting department to their own establishment, whereby the gas consumers will benefit through a reduction in the price of fittings, and an extended consumption of gas will be consequently promoted. It is due to Messrs. Messenger and Sons to state that they carried out their agreement with this company faithfully, and acted with liberality when handing over their remaining stock.

The Company has already commenced the new year with an extended order from the Conservancy Commissioners of Calcutta for 347 public lights, to be supplied from the company's mains, which will be laid in the second section of Calcutta. The prospects of the present year are therefore encouraging, and notwithstanding delays and disappointments, beyond the control of your executive, have checked their reasonable expectations, the directors' confidence in the ultimate success and prosperity of the company remains unabated.

The directors would fail in their duty if they concluded this report without bringing to the notice of the shareholders the zeal, activity, and judgment which have been continuously evinced by Mr. Anderson, in the management of this company's affairs in Calcutta.

The General Revenue Account shows a balance of £2920. 5s. 7d., out of which a dividend may be declared at the rate of £3 per cent. per annum, free of income-tax, payable on the 12th day of June next.

The retiring directors, on this occasion, are John Allan, James Barber, and Joseph Brown, Esqs.; and the retiring auditors are James Sydney Stopford, and Henry McLauchlan Backler, Esqs., who, being eligible for re-election, offer themselves accordingly.

Dr. *Balance-Sheet, to December 31, 1859.* *Cr.*

To 50,000 shares of £1 each		£50,000 0 0		By outlay as per balance-sheet, December, 1858		£78,372 17 7
49,990 ditto, 15s. paid		37,492 10 0		Outlay during year 1859, viz.—		
10 ditto, 2s. paid		1 0 0		Station-meter	£375 16 6	
		£87,493 10 0		Machinery, material, &c.	285 19 11	
Unclaimed interest, 1856	11 12 6			Pipes and mainlaying	512 12 2	
Ditto, 1857	6 16 0			Salaries, wages, &c. (construction)	359 1 5	
Ditto dividends, 1858	17 8 6				1533 10 0	
		35 17 0				£79,906 7 7
Contingent fund		114 8 0		Less value of stock and stores on hand		4118 14 10
Wear and tear account	295 12 6					75,787 12 9
Less repairs for the year	89 5 0			Cost of plant to 31st December, 1859		4550 5 0
		206 7 6		Fittings account		2758 8 0
Amount due by the company		4680 18 1		Amount due to the company		
Balance from general revenue account		2920 5 7		Value of stocks, viz.—		
				Coals	1547 8 0	
				Lime and purifying material	77 2 6	
				Products	488 6 0	
				Meters	568 6 0	
					2681 2 6	
				Pipes and sundry stores	2952 10 0	
						5633 12 6
				Balance in Calcutta	1316 11 11	
				Balance in London	972 6 0	
				India loan debentures, 1858	4432 10 0	
						6721 7 11
		95,451 6 2				95,451 6 2

Dr. *Profit and Loss, or Working Account for 1859.* *Cr.*

To cost of coal used	£4169 18 0		By gas rental	£9171 18 1	
Ditto lime used	333 0 2		Coke, tar, breeze, and liquor	1189 10 10	
Directors' and auditors' fees	467 0 0		Profit on meters	91 10 0	
Salaries in India and London	724 19 6			£10,452 18 11	
Engineers' Salaries in India	500 10 0		Transfer fees	11 19 6	
Wages in India	1205 8 6				
General expenses, including rent, gharry hire, postages, advertising, printing and stationery, medical attendance, and petty charges	581 17 6				
Wear and tear Account	295 12 6				
Bad debts and allowances	9 0 10				
	£8287 7 0				
Balance	2177 11 5				
	10,464 18 5				10,464 18 5

Dr. *General Revenue Account, December 31, 1859.* *Cr.*

To dividend of £2 per cent. to 31st December, 1858, declared at the general meeting, May, 1859	£1750 0 0		By balance of profit and loss account, 1858	£1909 12 1	
Income-tax thereon	36 9 2		Interest	301 8 3	
	£1786 9 2			£2211 0 4	
Balance	2920 5 7		Balance of profit and loss account, 1859	2177 11 5	
			Interest	318 3 0	
				2495 14 5	
	4706 14 9			4706 14 9	

The CHAIRMAN, in moving the adoption of the report, referred to the disappointments which the directors had experienced through the dilatory conduct of the Government and other authorities in dealing with the estimates which had been sent in by the company, and said he wished to impress upon the shareholders that whatever had been stated by him from that chair, was founded upon fact. In justification of his statements he read extracts from a letter addressed to the board by the managing director, dated Calcutta, Jan. 21, 1859, in which he said, "since my last there has been no increase to the lighting, either public or private,; but I called on Major Thuillier, and he told me that more lamp-posts were on the way, and that the commissioners were prepared to sign a further contract, for the 400 lights I mentioned some time ago, immediately their application to Government—a mere form—should be passed." Another extract stated, "the estimate for the fort has at last been sent in, and, I believe, from what the town major told me a few nights ago, the Government will pass it quickly, as they are most anxious to have the place lighted." It was upon these communications that the statements of the board at the last general meeting were based. During this year the managing director, in a letter dated Calcutta, January 24, 1860, stated, "Some little movement has again been made in the matter of the fort's lighting, and Mr. Clark was summoned to meet the garrison engineer last week, and was asked to amend the estimates, which he is now supposed to be doing." Thus it would be seen that a delay of a full twelve months had taken place, from causes altogether beyond the control of the company. The last letter received from the managing director, dated Calcutta, April 7, stated—"The estimates for the fort were sent in January last. I regret to this day being unable to advise you of any progress on the subject. Major Innes, then garrison engineer, and Colonel Kavanagh, the town major, were, as I informed you before, very anxious to have it passed; the former has since been removed to Gwalior, and the latter as governor of Singapore; and, as is usually the case in Government affairs, the subject has dropped for the present, the new incumbents requiring time to see what their predecessors have done." The shareholders would, therefore, see that the directors had had no control over the delays which had taken place, and could only regret that the anticipations they held out at the last meeting had not been realized. In the report, the progress of the public and private lighting for the year 1859 was fully stated; but, since the report was in print, the directors had been advised that 80 additional public lights and 68 private lights had been added to the consumption. The company's engineer at Calcutta having resigned, his successor had agreed to undertake the management of the works upon a salary and a commission upon the dividends paid to the shareholders, so that his interest in the success of the undertaking was in a manner identical with that of the proprietors at large. In conclusion, the chairman stated his willingness to reply to any inquries that might be proposed, and formally moved the adoption of the report and accounts.

Mr. BROWN seconded the motion.

In reply to inquiries by Colonel Anderson, Mr. Robarts, Dr. Beattie, Mr. Lambert, Mr. King, and others—

The CHAIRMAN said, the directors had taken 2s. per ton upon the amount of coals carbonized, for wear and tear of works, and that gave the sum of £295. 12s. 6d. in the account of profit and loss. It might be that they should have to increase that amount, but their experience at the present moment did not appear to justify it. In reference to reducing the number of the directors, he thought it would be better to keep the old blood in the management of their affairs when they found the duty devolved upon the board was well and faithfully discharged. The directors found it necessary to have a finance committee, a transfer committee, and a carbonizing committee; and any one at all acquainted with such undertakings would be astonished at the amount of work done for a little pay. Colonel Anderson had referred to the importance of having an efficient man in Calcutta. Mr. Clark's resignation had given them an opportunity of appointing Mr. Wilton, who was the gentleman who managed the Eastbourne Gas-Works, and raised them from a state of chaos into considerable prosperity—so much so, that the consumers at Eastbourne gave him a dinner. Mr. Wilton was so sanguine of doing in Calcutta what he had done at Eastbourne, that he went out upon a very small salary, asking only for 2½ per cent. commission upon the dividends paid to the shareholders. He (the chairman) was also sanguine of his success, and hoped that next year, when the proprietors met, they would have a much larger dividend and more satisfaction from the general state of their affairs than at present. Dr. Beattie had alluded to the large amount of £4680 due by the company, but the paragraph in the report which referred to the termination of Messrs. Messenger's contract, and the arrangements which the directors had made in regard to the gas-fitting department, offered a satisfactory explanation on this point. The remainder of the stock, which Messrs. Messenger handed over to the company, was not yet paid for, and that formed the larger portion of the sum due by the company. Dr. Beattie also asked how it was that the Indian loan debentures were less than before? The reason was, that the directors had had to sell some of them to pay their way, but they had made no loss by the transaction. The remaining debentures were at the company's bankers. As to the inquiry whether all the capital paid up had been expended, he replied that it was not. The capital of the company was £87,493; the outlay on plant had been £75,787; and there were £4432 in hand in debentures, besides the balance of cash in Calcutta and London.

A PROPRIETOR: Instead of the company owing debentures, they held them.

The CHAIRMAN said, in reference to the remuneration to the directors, he begged it to be understood that they had no intention of relinquishing any portion of their fees; but, when the balance-sheet was put before them at the end of the year, and they remembered the patience which the shareholders had manifested, and the disappointments they had experienced, they determined to carry half the amount of their fees to account which they had done. Dr. Beattie had taken exception to his remarks upon the position of the company, and said that, although their gas rental had increased to £9171, their working expenses had increased very much more in proportion. That might be true, but it arose in this way:—Last year, in making up their balance-sheet, the directors were obliged to carry a large portion of what now appeared in the profit and loss account to the cost of construction. They had now however done with construction, except some extra mainlaying, and therefore these charges were moved down to the profit and loss account. He might mention that the expenses for the last year, with a small addition beyond the cost of material, would have produced £20,000 of rental if the authorities had given them the lighting of the fort. They had now arrived at the turning point he believed, for they had 400 additional lights, and the fort in prospect.

A PROPRIETOR inquired what was the price charged for gas in Calcutta? He had been told that the high rate of the company was the great obstacle to their progress.

The CHAIRMAN said, the average for the public lamps was £9: the private consumers were charged 16s. per 1000. He believed it would be found that these prices were 20 per cent. less than in some of the colonies, and 40 per cent. less than in others. When the directors could pay the proprietors a good dividend, they would be happy to reduce the price of gas.

Mr. FAWCETT (a director) entered into some explanations in reference to the withdrawal of the custom of a large consumer of gas in Calcutta, and also replied to some observations which had been made on the subject of a reduction in the number of directors. He stated that the additional lighting which the company had secured since the report was prepared would increase their revenue by one-third without any proportionate increase in their expenditure.

The motion for the adoption of the report was then put and carried unanimously.

Mr. LAMBERT said, as a large shareholder, he felt bound to say that he

was exceedingly gratified with the management of the company by the present board, and had much pleasure in moving the re-election of the retiring directors.

Mr. HADLAND seconded the motion. Having had to do with one of the London companies for some years, he was quite satisfied, from the experience he had acquired, that it was the worst possible policy to remove old and faithful members of the board, merely for the sake of bringing in "new blood."

The motion was cordially adopted.

On the motion of Mr. ADDIS, seconded by Mr. DUFF, the retiring auditors were re-elected.

Mr. BACKLER returned thanks for himself and colleague, taking the opportunity thus afforded him of paying a well-merited compliment to the secretary, Mr. Baddeley, for the admirable manner in which the duties of his office were discharged.

Mr. HUGHLINGS moved—"That a dividend, at the rate of 3 per cent. per annum, free of income-tax, be now declared, payable on and after the 12th of June next."

Mr. HADLAND seconded the motion, which was agreed to.

A vote of thanks to the chairman and directors was then adopted and agreed to.

A vote of thanks to the secretary followed, and

Mr. BADDELEY, in acknowledging the compliment, said he was much gratified at the very complimentary manner in which his services had been spoken of. He could assure the proprietors that, next to the approval of his own conscience, he felt he could not receive a higher reward than the approbation and esteem of those whom he served. He had endeavoured zealously and faithfully to discharge his duty, and they might rely on the continuance of his exertions.

The proceedings then terminated.

THE GAS QUESTION IN GLASGOW.

REPORT by JAMES M'CLELLAND, Chartered Accountant in Glasgow, to the Sheriff of Lanarkshire, in the Petition at the instance of Messrs. Okell, Pringle, and Selkirk, John Sommerville and Sons, Wylie and Lochhead, MacKay and Kirkwood, Dawson and M'Nicol, William Melvin, and Brown and Drysdale, against The City and Surburban Gas Company.

"GLASGOW, *8th November*, 1859.—Having heard parties' procurators, and resumed consideration of this petition: Before answer, and without holding the defenders as admitting any of the statements in the petition, remits to Mr. James M'Clelland, Accountant in Glasgow, to ascertain the actual state and condition of the concern called The City and Suburban Gas Company, and to report *quam primum*, the said report being so framed as to show whether the profits of the said concern, for the year preceding the 30th June, 1859, have exceeded the rate of 10 per cent. on the paid-up capital, and whether the whole of the revenue fund has been and remains invested.

(Signed) HENRRY GLASSFORD BELL.
Sheriff Substitute.

In terms of this interlocutor, the accountant proceeded to make an investigation into the whole affairs of the City and Suburban Gas Company. For this purpose, the books reports, and vouchers, and other papers of the company, were freely placed at his disposal, and from these sources the accountant prepared a draft report, which was read to the parties at a meeting held for the purpose. In discussion thereon, a difference of opinion arose between the parties, as to the power of the accountant to refer, in his report, to the balance-sheets or affairs of the company, prior to the year 1858; and he found it necessary to submit to the sheriff an interim report stating the difficulty. On consideration of this interim report, and of another rendered necessary by a re-remit to the reporter, the court found that, to complete the terms of the original remit, it would be necessary to make reference to the affairs of the company for the years prior to the one ending June, 1859. The accountant will, therefore, now proceed to comply with the terms of the remit embodied in the interlocutor of the 8th of November, 1859.

Soon after the passing of the Act 6th and 7th Victoria, incorporating the company, the works were rapidly and successfully built, and the necessary appliances for the supply of gas to the citizens completed in 1844, when the company began to make gas.

The first financial balance-sheet was struck at 30th June, 1845. The result of the year's operations, after providing £200 for the contingent fund in terms of the Act, and writing off for deterioration the sum of £100, showed a surplus revenue of £4188. 18s. 11d.; a dividend of 3½ per cent. was declared from this surplus on the then paid-up capital of £114,520.

During the above year, gas was supplied to the public at 6s. 8d. per 1000 cubic feet, and the average price for coal laid down at the works was 13s. 3d. per ton.

In the manufacture of gas, the chief outlays needed are for the supply of coal and the payment of wages. The wages in each year do not vary greatly in amount, but the fluctuations in the value of coal, and the changes in the quality of the article used, tend to increase or diminish the price at which gas can be produced, according to the market value of that article.

For the year ending this date, (30th June 1846), the surplus revenue, after setting apart £390 for the contingent fund, and writing off for deterioration the sum of £400, amounted to £7980. 6s. 2d.

From this surplus the directors declared a dividend of 7½ per cent. on the paid-up capital of £114,520.

The price of gas continued at 6s. 8d. per 1000 cubic feet, although the average price of coal was 14s. 9½d. per ton, being a considerable advance on the price paid in the preceding year.

For the year ending this date (30th June 1847), the surplus revenue, without any allowance being made for deterioration, amounted to £7663. 18s. 8d. In addition to this, a sum of £935. 12s. 1d. had been realized as a premium on the sale of pipes, and this sum being carried to the surplus revenue, a dividend of 6-⅝ per cent. was declared on the paid-up capital of £128,835. The provision this year for the contingent fund was not made from the revenue, but the sums written off for deterioration, amounting to £556. 17s. were transferred to the credit of the contingent account, thereby absorbing the sums set apart in two previous years for deterioration, and closing that account for a time.

The price charged for gas during the year was reduced to 5s. per 1000 cubic feet, and the average cost of coal was 15s. 6¼d. per ton, being a further increase in the price paid in previous years.

For the year ending this date (30th June 1848), the surplus revenue, still without any allowance for deterioration, amounted to £6429. 19s. 11d. During this year, the provision for the contingent fund was not taken from the revenue, but premiums on the sale of stock, amounting to £325. 12s. 6d. were carried to the credit of that account.

From the surplus revenue the directors declared a dividend of 5 per cent. on the paid-up capital of £128,835.

The price of gas still continued at 5s. per 1000 cubic feet; but the average cost of coal during the year was so high as 18s. 9½d. per ton, which tended to diminish the surplus revenue for the year.

For the year ending this date (30th June 1849), the surplus revenue, after providing £400 for the contingent fund, amounted to £8231. 1s. 6d. from which the directors declared a dividend of 6·390 per cent. on the paid-up-capital of £128,835. No sum was set apart for deterioration.

The price of gas continued at 5s. per 1000 cubic feet, but a considerable reduction took place in the cost of coal, the average price being 14s. 10d. per ton.

For the year ending this date (30th June, 1850), the surplus revenue, after allowing £500 for the contingent fund, amounted to £10,539. 2s. 5d. from which the directors declared a dividend of 7·777 per cent. on the paid-up capital of £128,835.

The price of gas continued at 5s. per 1000 cubic feet, and the coal was supplied at an average cost of 12s. 5½d. per ton, being still lower than the price paid in the previous year.

For the year ending this date (30th June, 1851), the surplus revenue, after allowing £572. 12s. for the contingent fund, and writing off for deterioration the sum of £2500, amounted to £11,384. 3s. 5d. from which the directors declared a dividend of 8·888 per cent. on the paid-up capital of £128,835.

The price of gas was still at 5s. per 1000 cubic feet, and the cost of coal continued to diminish, the average price being 11s. 9¾d. per ton.

For the year ending this date (30th June, 1852), the surplus revenue, after providing £640 for the contingent fund, and writing off for deterioration an additional sum of £2500, amounted to £13,151. 0s. 7d. from which the directors declared a dividend on the paid-up capital of £143,150 of 9 per cent.

The price of gas still continued at 5s. per 1000 cubic feet, and the average cost of coal was 11s. 11¾d. per ton, being very much similar to the price paid the previous year.

For the year ending this date (30th June, 1853), the surplus revenue, after allowing £715. 15s. 2d. for the contingent fund, and writing off the sum of £3374. 4s. 10d. for deterioration, amounted to £14,284. 12s. 4d. from which a dividend of 10 per cent. was declared on the paid-up capital of £143,150.

The price of gas still continued at 5s. per 1000 cubic feet, and the average cost of coal for the year fell as low as 9s. 9d. per ton.

It will be observed that the company now, for the first time, found themselves in a position to pay the maximum rate of dividend, or 10 per cent. The causes which chiefly operated to produce this result were evidently the gradual and profitable extension of the business of the company, the increase of population, the development of trade, and the diminished cost at which the company were enabled to procure coal.

The state of the revenue for this and the two preceding years placed the company in a position to write off considerable sums for deterioration of the works and plant. It also enabled them to continue an increased expenditure for general repairs. But, when it was considered that the works had now been nine years in existence, and that the total amount written off for this period does not exceed 5·025 per cent. on the gross expenditure; and, considering the perishable nature of some portions of the works and plant, the reporter does not think that the company would have been justified in writing off, for deterioration up to this time, less than they appear to have done.

The business during this year (30th June, 1854), appears to have been equally prosperous with the preceding. The company were enabled to lay aside from the profits a sum of £679. 3s. 4d., which, with the appropriations of former years, was sufficient to make up the £5000 stipulated by the Act to be set apart as a contingent fund. They were also enabled to provide an additional sum of £2300 for deterioration on works and plant, and, out of the balance of the profits, amounting to £13,666. 4s. 2d., the maximum dividend of 10 per cent was declared on the paid-up capital of £143,150.

A reduction was also made during the year in the price of gas, the rate charged being 4s. 7d. per 1000 cubic feet. The average cost of coal was 9s. 10d. per ton, being nearly the same price as in the previous year. The price for both years was very moderate, and formed, with the augmented consumption of gas, the chief operating cause of the increased surplus revenue of the company.

For the year ending this date (30th June 1855), the surplus revenue, without any allowance for deterioration, amounted to £14,502. 16s. 7d. which, with the sum of £226. 15s. 9d. taken from the premiums obtained in the sale of stock, hereafter noticed, enabled the directors to continue the maximum dividend of 10 per cent. on the paid-up capital of £147,690.

The price of gas still continued at the reduced rate of 4s. 7d. per 1000 feet; but a very important advance had taken place in the cost of coal, the average price for the year being 13s. ¾d. per ton.

For the year ending this date (30th June 1856), the surplus revenue, without any allowance for deterioration, amounted only to the sum of £11,185. 11s. 4d. Several causes combined to produce this result. While the average price of gas supplied to the public continued at 4s. 7d. per 1000 cubic feet, the price of coal had risen from 9s. 9d. per ton, the average of 1853, to 16s. 2¾d. the average price paid during the current year. The wages of workmen employed in the manufacture of gas had advanced, during this period, about 20 per cent.; and, from the operation of the new law of assessment for public companies, the local rates payable in this year were double those of the previous year.

With this increased expenditure and diminished surplus revenue, it is clear the company could not have continued to pay the maximum rate of dividend. The nett earnings of this year would not have admitted of more than 7·457 per cent. being paid to the shareholders. The company continued, however, the 10 per cent. dividend. To enable them to accomplish this, 685 shares of the stock, which had long been held by the directors for behoof of the company, were sold, and realized, over and above their par value, a premium or profit of £6893. This sum was carried to the credit of an account in the books of the company, entitled "Premium Account;" and from this account was taken £2814. 8s. 8d. the sum necessary to make up the 10 per cent. dividend on the paid-up capital of £150,000.

The dividend this year was paid for the first time under deduction of Income-tax. Had the revenue now remained stationary, in place of showing a progressive increase, nearly the whole premiums derived from the sale of the shares would have been required to have kept up the rate of dividend paid.

The amount derived from gas rates this year (30th June, 1857), appears to have increased considerably over the previous year; but, from the causes already alluded to, the profits or surplus revenue of the company amounted only to £11,943. 8s. 9d. This sum would, without laying aside anything for deterioration, have yielded a dividend of 7·962 per cent. on the paid-up capital of £150,000. But the company, in anticipation, it is presumed, of a gradual increase of rates for the extensions which were being made, continued the maximum dividend of 10 per cent.; and, for the purpose of supplying the

deficiency, encroached again on the "Premium Account," before noticed, to the extent of £2056. 11s. 3d. The dividend was this year again paid under deduction of Income-tax.

The directors appear now to have become satisfied, that the maximum dividend could not be continued, while the price of gas remained at 4s. 7d. per 1000 cubic feet. They accordingly, in November 1856, raised the rate again to 5s.

Coal had now reached its highest point since 1848, the average price this year being 17s. 7d. per ton.

For the year ending this date (30th June 1858), the nett surplus revenue amounted to £12,837. 15s. 9d., which, on the paid-up capital, would have yielded a dividend equal to 8·558 per cent.; but the company followed the same course pursued on the two former occasions, and continued the maximum rate of dividend by transferring the balance now standing at the credit of the "Premium Account," amounting to £1795. 4s. 4d. to the surplus revenue for the year. This dividend was also paid under deduction of Income-tax.

The rate charged for gas during the year was 5s. per 1000 cubic feet, and the average cost of coal was 16s. 6d. per ton.

The foregoing brief account of the company's position in each year, from 1845 to 1858, is brought down to the balance previous to that of 30th June 1859, the year to the operations of which the inquiry under the Act is more particularly directed. But, before proceeding to give a detailed account of the operations for that year, it may be proper to review the working of the company, from its formation to the 30th June 1858, and to state shortly the results of the inquiry, so far as it has gone.

It appears, then:—

1. That, from the commencement of the operations of the company till the balance of June 30, 1858, the paid-up capital of the concern averaged, for the whole period, the sum of		£135,740	0 0
2. That the average expenditure on works and buildings was, for the whole period		156,228	0 0
(The outlay over and above the capital being supplied by the company's bankers, and by loans from the public.)			
3. That the average gross income was		33,433	0 0
4. That the average working expenses were		20,983	0 0
5. That the average quantity of gas manufactured, as indexed by the station-meter at the works, in cubic feet, was		159,737,748	
While the average quantity of gas sold, as indexed by the consumers' meters, in cubic feet was		130,498,300	
Showing a loss of cubic feet		29,239,448	
(The cause of which will be adverted to in a subsequent part of the report.)			

6. That, assuming the working expenses at the average above stated, the cost of manufacturing gas, during this period, was 3s. 2d.·590 per 1000 cubic feet.

7. That the average rate charged the public was 5s. 1d.·486, showing an apparent profit of 1s. 10d.·896 per 1000 cubic feet.

8. That the net income or surplus revenue of the company for this period averaged £10,570 13 0

9. That if the average profit was made on the average quantity sold, it would stand thus:—

130,498,300 cubic feet, at 1s. 10d.·896		£12,449	10 0
And that if from this are deducted the sums appropriated for—			
Interest of loans	£794 4 0		
Deterioration	762 8 0		
Contingent fund	329 16 0		
	£ 1,886	8 0	
An approximation is obtained of the net average income		10,563	2 0

10. That, for the last fourteen years, the average income would pay upon the average capital an average dividend of 7·787 per cent.

11. That, during the same period, the company has paid an average dividend of 8·200 per cent.

12. That the difference between the average dividend earned by the manufacture and sale of gas, and the average dividend paid, has been supplied by the appropriation of the premiums on the sale of shares.

Should the above results be accurate, and there seems, from the investigation hitherto made, to be no doubt they are so, the conclusion to which the reporter comes, is, that at no period, prior to the balance of June, 1858, was the company able, unless from sources other than the regular profits derived from the making of gas, to pay an average dividend equal to the maximum of 10 per cent. allowed by the statute.

The reporter will now proceed to the investigation of the accounts of the company for the year ending June 30, 1859, already alluded to as the period to which the present inquiry is more particularly directed.

To enable a searching and satisfactory examination to be made, the whole books and vouchers were placed at the command of the reporter, and every facility afforded him for conducting the investigation.

The books consisted of:—

1. Ledgers for the various districts of the city, containing a record of the gas used by each consumer, and of the amount due by him.
2. Cash-books, wherein the collections are entered as they are made daily, and from whence they are posted to the various accounts in the ledger.
3. Abstract-book of the collections of gas-rates, wherein is entered the amount of the daily collections for each district of the city, and which show, at the end of each month, the aggregate collections from all the districts.
4. General cash-book, journal, and ledger, for the capital revenue, and other accounts of the general business of the company.

The whole of the books, for the period under notice, have been carefully examined; the postings at different dates accurately tested in the district ledgers; the district cash-books have been compared, added, and checked with the rates collected, and proved to agree with the aggregate summations of the rates in the abstract-book; the aggregate summations of the abstract-book have been proved and tested with the gross amount at the credit of the revenue account in the ledger, and found correct; the whole entries in the general cash-books have been compared with the vouchers, pay-bills, and bank-books; the postings of the journal into the ledger have been proved; the balances of the accounts in the ledger, showing the transactions for the year, have been checked; and, finally, the balances on the capital and revenue accounts, now to be noticed, have been found correctly stated.

The system of accounts and books has been found well fitted to give a clear and distinct view of the business and various operations of the company, in manufacturing and supplying the public with gas. It is, at the same time, such as to afford to the shareholders a correct vidimus of the affairs intrusted to the management of the directors.

The reporter here submits a concentrated view of the capital and revenue account, as at June 30, 1859, as these are stated in the books noticed above, beginning with the

Capital Account.

This account shows, under the following heads, the sums which have, since their original formation, been expended from time to time on the works, and exhibits the total outlay at June 30, 1859:—

1. Formation of works		£52,573	4 7
2. Pipe account		61,606	3 9
3. Gas-meter account		28,642	18 6
4. Gas-fittting account		15,780	3 1
5. Dalmarnock property		3,990	5 4
6. Gasholder framing		5,425	8 10
7. Iron roofs on buildings		6,802	14 6
8. Station-meter		833	8 0
9. Works' wages account		2,613	10 7
10. Town's wages account		26,316	16 7
11. Counting-house furniture		224	15 6
12. Gasholders		4,527	6 0
13. Parliamentary expenses		9,337	14 2
		£218,674	9 5

Funds for this expenditure have been raised in the following manner, viz.:—

1. Investments made by shareholders in stock			£150,000	0 0
2. From the bankers of the company, on an open credit			22,000	3 0
3. From the public, on bonds and mortgages			34,500	0 0
4. From contingent-fund, for sums set apart from the revenue, in terms of the Act of Parliament			5,500	0 0
5. From the revenue, for surplus at June 30, 1859	£15,046	4 6		
6. Balance at credit of revenue account, prior to June, 1859	8	0 1		
7. Unclaimed dividends	614	19 2		
	£15,669	3 9		
Less amount invested in coal and lime for stock on hand, and due the company for sundry outstandings	8,994	17 4		
			6,674	6 5
			£218,674	9 5

According to the Acts of Parliament under which the company is incorporated, the directors are authorized to raise the following sums, viz.:—

1. Under the original Act of 1843, the company were authorized to raise	£150,000	0 0
2. By the Act obtained in 1857, powers were given to create new stock to the extent of	50,000	0 0
3. The company were also allowed to borrow, on bond or mortgage, a fourth part of their paid-up capital, which may be taken at	50,000	0 0
4. Making the total money powers and resources of the company	£250,000	0 0

At the balance of the 30th of June, 1858, it appears that the total outlay on capital account amounted to £204,696 3 6

From this period till the end of the year under notice, the company had expended on works the following sums, viz.:—

1. Formation of works	£5,349	14 0	
Less sum carried to the debit of revenue, for deterioration on retorts	800	0 0	
	£4,549	14 0	
2. On pipes and mains in extension of the means of supply of the company	3,307	12 4	
3. On additional supply of meters to the consumers of the company	1,376	3 0	
4. On gas-fittings for supply to ratepayers	710	14 0	
5. On the purchase of a site at Dalmarnock, for the erection of additional gasholders	1,954	12 6	
6. On workmen's wages connected with the above operations, and with the general works of the company	2,079	10 1	
		13,978	5 11
Total expenditure on works and plant at June, 1859		218,675	9 5
Thus showing the resources still at the command of the company to be		£31,325	10 7

It will be observed that hitherto the company have refrained from exercising the power given them, under the Act of 1857, to create new stock; but, to enable them to carry forward the extension of their works, and of the mains and pipes to those portions of the city requiring supply, arrangements appear to have been made with the bankers of the company to advance a portion of the necessary funds, and loans at moderate rates of interest have been obtained from the public for the like purpose.

In this way, the revenue has been burdened only with interest on the loans and overdrafts, and has been hitherto saved from the charge of 7½ per cent. which would have fallen on it, as the maximum dividend on any stock that might have been issued, instead of raising the money by borrowing. This seems, however, to be only a temporary expedient. As the revenue of the company increases, and is in a position to bear a greater burden than the maximum dividend on the original stock, the company will doubtless issue the new stock. A very salutary provision for the public is, however, made in regard to the issue of this stock. It must be sold at auction, and the company are bound to set apart the premiums received thereon, and apply them in extension of the works.

Under the provisions of the Act 1843, the company were bound to lay aside, from time to time, from the profits, as a reserve or contingent fund, the sum of £5000. Between the years 1845 and 1854, this sum was so set aside, and is entered to the credit of an account in the company's ledger, entitled "Contingent Fund." It does not appear to have been paid out of the funds of the company for investment in any separate undertaking, and now forms part of the money used in the extension of the works. Between the years 1854 and 1859, no appropriations have been made for the contingent fund; but in June of the latter year, £500 were set apart and carried to the credit of the same account as the £5000, and used for the like purpose.

The collections on account of the revenue in the course of the year have also been employed, from time to time, in meeting the expenditure on works, thus lessening the demands on the open credit at the bankers. In this manner, both the contingent and revenue accounts go to reduce the company's requirements for borrowed money, and thereby lower the interest which would otherwise be payable. It may be a question whether the mode adopted with either of these two accounts is correct. At all events, there seems to be no doubt that the contingent fund ought to have been invested in some eligible security separate from the business of the company.

In testing the stability of the works of a company such as this, it is of considerable importance to all parties to examine the mode which the outlays on various portions of the establishment have been treated, from the

period of the original investment to the present time. The reporter has made a careful examination into this matter. He finds, that, in the early part of the company's affairs, it apparently received very little attention. About the year 1851, the directors became alive to the necessity of appropriating a portion of the revenue to meet the deterioration of the works and plant.

Accordingly, between the years 1851 and 1854, there was laid aside from the revenue, under a branch of expenditure, "general deterioration on works," the sum of	£10,674	4 10
(In the years that have since elapsed, no further sum has been placed to this account, the income of the company, after providing for the maximum dividend, not admitting of this being done.)		
From 1846 downwards, general repairs have, however, been gradually made on the works, the amount of which, down to the present time, is	9,266	2 11
It thus appears, that, for deterioration and repairs, there has been provided, since the formation of the works	£19,940	7 9

Now, if the total gross expenditure is assumed (including the above sum of £19,940. 7s. 9*d.*) at £238,614. 17s. 2*d.* it will appear, that, during the company's existence, which has extended over fifteen years, the average deduction for the above purposes, for this period, has been 8·349 per cent., or at the yearly rate of 0·556 per cent.; and, when the perishable nature of a portion of the outlay is considered, the above allowances for deterioration will appear small to some and insufficient to others.

Included in the capital account, there is an item of expenditure for apparatus which, from its liability to decay, might have more naturally been charged to the revenue. In the manufacture of gas a cast-iron retort is used. The number of these built into ovens at the works is 668: the whole are not in use at one time. There are 450 making gas just now: as these get worn out, fresh ones are put in operation. The average cost of each retort is £3. 12s., and their average working age is from a year to eighteen months. There is thus needed a constant supply to meet the wants of the works. In order to cover this rapid waste of the apparatus, an annual allowance has been made from the revenue. For the past fifteen years, this allowance amounts to £10,353. 2s., and may, to a certain extent, be taken as an additional deduction for tear and wear on capital account.

Revenue Account.

The details of this account, for the year ending the 30th of June, 1859, have been examined into, and, as in the other accounts for the year, the books and vouchers, connected both with the revenue and expenditure, have been tested and found correct.

The following figures may, therefore, be taken as showing the results of the operations for the year under notice:—

Receipts for Revenue.

1. From gas rates—			
(A) Amount collected from the ratepayers		£50,838	8 2
(B) Arrears of gas-rates outstanding at balance of June, 1858	£3,322 11 8		
Less sum taken credit for in last year's account	3,100 0 0		
		222	11 8
(c) Estimate put on arrears due by 6273 debtors at this balance, amounting to £4566. 14s. 2d.		2,000	0 0
		£53,060	19 10
2. From the products of gas making—			
(A) Tar and ammoniacal liquor	£3,590 12 2		
(B) Coke	1,665 10 5		
(C) Lime	246 9 7		
(D) Old iron	220 18 0		
		5,723	10 2
Gross revenue for 1859		£58,784	10 0

Disbursements from Revenue.

1. General expenditure—			
For the cost of 30,182 tons of coal	£24,669 15 0		
Limestone	605 4 10		
Wages to firemen	5,992 13 11		
Salaries to the secretary, manager, book-keeper, cashier, collectors, and other assistants	3,000 0 0		
Allowance to directors for superintendence	300 0 0		
Public rates, assessments, and feu duties	1,903 0 5		
Repairs, renewal, and deterioration of retorts used in manufacture of gas	800 0 0		
General repairs on works through the year	1,382 1 5		
Income-tax	308 8 9		
Stable account	246 7 6		
Stationery and printing	206 19 6		
General charges	596 9 9		
	£40,011 1 1		
2. For interest on loans from the public, and overdrafts at the bankers	3,150 9 7		
3. Abatements allowed consumers for escapes, &c.	76 14 10		
4. For sum set apart to the credit of contingent account, No. 2	500 0 0		
Total expenditure		43,738	5 6
Showing a surplus revenue for the year of		£15,046	4 6

The above surplus was appropriated thus:—

1. In payment of a dividend of 10 per cent., *free of income-tax*	£15,000	0 0	
2. In carrying to the credit of an account in the books, styled "Reserve Fund"	46	4 6	
		15,046	4 6

In examining into the details of the revenue, the reporter has found that the income has been collected from upwards of 26,000 consumers. The course adopted by the company, in making their collections, is to cause three distinct surveys to be made of the city in the course of the year, to ascertain the quantity of gas burned by each consumer. An account is rendered, and separate collections made, for each survey; and in a vast number of cases, chiefly among the labouring and poorer classes, the sums due have to be taken up by instalments. The revenue, in this way, needs great attention and application in the collection, there being, from one end of the year to the other, upwards of 80,000 payments. These cannot be collected without considerable risk of loss; accordingly, it appears, from the revenue account, that the arrears for the present year amount to £4566. 14s. 2d., owing by 6273 debtors.

In addition to this cause of loss, it has been found that the quantity of gas manufactured in 1859, as indexed by the station meter at the works, in cubic feet, was	265,804,038
While the sale of gas to the public, for the same period, as indexed by the consumers' meters, including the estimated consumption by stair-lights and public lamps, amounted, in cubic feet, to	231,889,500
Showing a waste for the year of	33,914,538

Assuming the stock on hand to be the same as at the beginning of the year. The causes which have tended to produce this result are, condensation in the mains and pipes, and leakage in transmission through the city. The loss in this year, as above shown, is equal to 12·759 per cent. on the gross make. This contrasts favourably with the loss in the preceding years, formerly noticed—the average being equal to 18·300 per cent. on the make.

This loss tends, of course, to raise the average cost of production, and seems inherent in the whole system of gas-making in large cities.

The income from gas rates compares favourably this year with the returns for the previous year—the increase being equal to 15·230 per cent. This has been caused partly by an improvement in the trade of the city, causing increased consumption; and, from the mains and pipes laid in the outskirts becoming progressively remunerative with the extension of the city and the growth of the population. But the chief operating cause for this year may be found in the contract which the company has been enabled to make for lighting the public lamps. This has made a considerable addition to the consumption, and a consequent increase to the income.

The cost of gas for the year has been 3s. 9d. per thousand cubic feet, and the selling price 5s.; the difference of 1s. 3d. forming the source whence the company pay the dividend to the shareholders. Although the charge to the public is fixed at five shillings per thousand cubic feet, according to the practice of the company, graduated discounts are allowed to all consumers paying rates at and above four pounds per annum. During the year 1859, the allowances under this head amount to £2663 5s. 9d. and, taking the gross income from gas rates at £53,060 19s. 10d., it is found that an average deduction of about five per cent. on the price, or 3d. per thousand cubic feet, has been allowed on the whole consumption.

The inconsiderable balance of £46. 4s. 6d. which arises on the revenue account for 1859, and in the books is termed the "reserve fund account," has been placed in the National Bank of Scotland, in terms of the 31st section of the "Gas Work's Clauses Act, 1847." The surplus or reserve in the years prior to 1859 has not been invested. It amounts to £8. 0s. 1d. and, like the £5500 held in contingent account, still forms a portion of the resources whence the surplus expenditure on capital account has been derived.

The conclusion to which the reporter comes, in considering the capital and revenue accounts for the year under discussion, is, that the profits on the face of the above accounts have been barely sufficient to pay the maximum dividend of 10 per cent.

As already reported, from the year 1854 down to the present time, no allowance has been made from the revenue for deterioration of the works and plant. The necessities of the company, in struggling to keep up the uniform dividend of 10 per cent. seemed to have led them to overlook this primary condition of the prosperity of a public company; and though looking to the ordinary increase that may be expected to accrue to the revenue and resources of the company, there is no reason to doubt their ability to remedy this oversight; yet the reporter is of opinion that any surplus, beyond payment of the maximum dividend, will not be required for some time to come to increase the deterioration fund necessary to be set apart for the stability of the works and plant; and that no reserve of any importance is likely to arise to affect the price now payable for the gas supplied to the public.

The resources of the company are, however, very considerable. The gradual increase of consumption from the mains and pipes in the suburbs, which have hitherto yielded a small return, will yearly tend to improve the revenue; and should the capital account not be further largely increased by extensions, and the cost of coal be lessened, there is a likelihood that, in a few years hence, a reduction in the price of gas may be looked for.

Respectfully reported by
(Signed) James M'Clelland, C.A.
Glasgow, May 9th, 1860.

Presentation of a Testimonial to Mr. F. Kitt of Bath.—We have pleasure in recording the presentation of a gratifying testimonial to Francis Kitt, Esq., the Engineer and Manager of the Bath Gas Works, by the workmen under his employ. The testimonial, consisted of a very handsome silver tea service, on which was engraved the following inscription:—"Presented to Mr. Francis Kitt, Manager of the Bath Gas Works, by the Workmen and their Friends, as a token of esteem. May 9, 1860." An address was presented at the same time, which Mr. Kitt acknowledged, with much feeling, amidst loud and hearty cheering from the men, and having dwelt on the important position of the master and the necessary steps to gain the esteem and goodwill of his workmen, he thanked them most cordially for the zeal they had always manifested for his commands, and trusted they would ever remain in the same spirit towards each other. The customary toasts being drank, the whole of the men sat down to an excellent cold collation, provided by the surplus of the subscriptions, to which ample justice was done.

Hibernian Gas-Works, Dublin.—Mr. William Romans, the assistant-engineer at the Imperial Gas-Works, King's Cross, has, we are informed, been elected to fill a similar situation at the United General Gas Company's Works in Dublin.

Hadlow Gas-Works.—The following tenders were received by the Hadlow Gas Company (Limited) on the 23rd ult., for the buildings and gasholder, and for the supply of other materials required in the construction of their works—Buildings, tank, gateway, and fencing:—

Eldon	Hadlow	£347	13 0
Chittendon	Tunbridge	315	10 0
Leeds	Hadlow	305	10 0
Waghorn	Southboro'	297	10 0
Warren	Hadlow	275	10 0

A gasholder, 24 feet diameter by 12 feet deep, erected complete, with columns; two purifiers, 4 feet square by 2 feet deep, scrubber, and hydraulic main, delivered in London, but not erected:—

Alfred Penny	London	£265
G. Cutler and Co.	"	195

Street mains, per yard, delivered at the Bricklayer's Arms Station:—

	5 in.	4 in.	3 in.	2 in.	1¼ in.
G. Cutler and Co.	3s. 9½d.	2s. 9½d.	2s. 0½d.	1s. 6½d.	1s. 3d.
Alfred Penny	3 9	2 8	2 0	1 4	—
Lynch White	3 7	2 7	1 10	1 2	1 0
Cochrane and Co.	3 5½	2 5½	1 9	1 1½	0 11½

The lowest tenders were in all cases accepted.

Price Current.

CASTINGS, per Ton.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 10 0	2 10 0	2 15 0	3 0 0	3 5 0
1¼ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 ,, ,,	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 ,, ,,	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards ,,	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
,, 2nd ,, cold ,,	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ⅜ thick and above	6 0 0	5 5 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Syphons, 2 quart	1 0	0 8	0 7	0 5	0 4	0 3
	15 0	14 0	13 6	13 0	12 0	—

COALS, per Ton.

Newcastle.—Unscreened.	6s. 3d.
Whitwell Primrose	
Medomsley, Eighton Moor, and Burnhope	6 6
Pelaw	6 9
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 0
Pelton	7 9
Ramsay's Newcastle Cannel	16 0

Scotch Cannel.	45s. 0d.
Boghead, at Leith	
Kirkness, best	23 0
Capeldrae, 1st quality	20 0
,, 2nd ,,	12 6
Lesmahago, at Glasgow	25 0
,, ,, Leith	27 6
Arniston	27 6
Wemyss	20 0
Knightswood	18 0
Pirnie	15 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.	6s. 6d.
Chatham & Rochester	
Cork	11 6
Dover	8 0
Dublin	11 0
Exeter Quay	9 6
Folkestone	8 0
London (Pool)	6 3
Lowestoft & Yarmouth	5 3
Lynn	—
Portsmouth	8 0
Plymouth	9 0
Ramsgate & Margate	8 0
Whitstable	7 0
Weymouth	9 0

Foreign.—Per Keel.	£8 0 0
Boulogne and Calais	
Barcelona	25 0 0
Bordeaux	16 10 0
Cadiz	16 10 0
Copenhagen	9 0 0
Dieppe	9 0 0
Genoa	25 0 0
Hamburg	8 15 0
Havre	9 10 0
Leghorn	25 0 0
Lisbon	17 0 0
Rotterdam	8 5 0
Stettin	11 0 0
Trieste & Venice	£26 to 28 0 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d.			
Cliff's Fire-bricks, at Wortley	per 1000	57 6			
Ingham's Fire-bricks, at Wortley	,,	55 0			
Fire-clay Retorts	per foot run, 5s. 6d. to	7 0			
Tough Cake Copper	per ton	£107 10s.	Foreign Spelter	per ton	£ 20 2 6
English Pig Lead	,,	21 15	English Block Tin	,,	136 0 0
Welch Bar Iron, in London	,,	6 10	Banca	,,	136 0 0
Tarred Rope Yarn	per cwt.	26s. 0d.			

Advertisements.

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E. W. LADD and CO. are now prepared to supply Copies of the Standard Cubic Foot constructed by them for the Office of Her Majesty's Exchequer.

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Standard Weight and Measure Manufacturers, and Hydrometer, &c., Makers to the Board of Inland Revenue,

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STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER and CO. (Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.

Shipments on the shortest notice.

TO GAS COMPANIES AND CONTRACTORS.

FOR Sale, several lengths of Hydraulic MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for DIP-PIPES.
Also 4-inch ASCENSION-PIPES, and 3-inch ARCH and DIP-PIPES, and RETORT MOUTHPIECES, all in excellent condition, and will be sold at a very low price, and delivered, if required, at any Railway Station in London.
To be seen, on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

TO GAS COMPANIES AND GAS CONTRACTORS

CHEAP AND EXPEDITIOUS MODE OF MAKING GAS,
PATENTED BY

MR. GEORGE WALCOTT,
24, ABCHURCH LANE, LONDON.

ADVANTAGES.

The whole of the Furnace Fire is employed; whereas, by the common method, half is lost by the reverse sides of flues and arches. The construction of the Retorts for generating Gas is extremely simple, cheap, and lasting. An arrangement whereby the Carbon encrusting the inside of Retorts is easily removed.
Arrangements may be made for working this patent in Scotland and Ireland; also, for taking out the patent in France, &c.

Just Published, Price 2s., by Post, 2s. 1d.,

REPORT of the Arguments, and the JUDGMENT of the COURT of QUEEN'S BENCH, in the case of the STOKE FENTON AND LONGTON GAS COMPANY, and the LONGTON GAS COMPANY (LIMITED), and OTHERS.

W. B. KING, Office of the "JOURNAL OF GAS LIGHTING," &c., 11, Bolt Court, Fleet Street, LONDON, E.C.

SALE OF GAS ACT.—At a Meeting of MANUFACTURERS of GAS-METERS, held at Radley's Hotel, New Bridge Street, Blackfriars, on Tuesday, May 29, 1860,—Mr. ROBERT BEVERLEY, of Leeds, in the chair,—the Honorary Secretary (Mr. W. Crosley) read minutes of the proceedings of the last Meeting and the correspondence of the Committee, &c., since then.
The following resolutions were then adopted:—
Moved by Mr. Hulett, and seconded by Mr. Glover: "That a memorial be sent to Lord Redesdale to the effect that it is desirable that the present Act do come into operation, and not any amendment be proposed in the present session of Parliament, except an extension of time for six months—instead of twelve months, as proposed by an amended Bill now in the House of Lords. Such extension of six months being now considered requisite, in consequence of the delay which has already taken place in depositing the requisite models at the Exchequer, and, consequently, the impossibility of now being able to obtain duplicates of the same within the time prescribed by the Act."
Moved by Mr. Edge, and seconded by Mr. Rait: "That a memorial be sent to the Lords of the Treasury, to know whether the gasholders will be lodged at the Exchequer, in accordance with the Sale of Gas Act, in the first week in June, as promised."
Moved by Mr. Hartley, and seconded by Mr. Defries: "That a general repeal of the Bill be opposed by every legitimate means."
Moved by Mr. Defries, and seconded by Mr. Edge: "That the best thanks of this meeting be given to Mr. Sheridan, for his unwearied exertions in his endeavours to get the Sale of Gas Act carried into operation through great difficulties and opposition, and that the Honorary Secretary communicate the same to Mr. Sheridan."
Moved by Mr. Glover, and seconded by Mr. Hulett: "That a deputation of this meeting wait upon Mr. Deedes, M.P., to state its views in reference to the bill he proposes to bring into Parliament, the deputation to consist of Mr. Beverley, chairman; Mr. Defries, Mr. Glover, Mr. Edge, and Mr. Crosley, Honorary Ssecretary."

CAUTION.

TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and
NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.
CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

CANNEL and COAL of the best descriptions for making GAS and COKE.
(As per Analyses.)
GAS CANNEL, 17s., 15s. 6d., and 14s. per ton.
GAS COAL, 11s. 6d., 9s. 6d., and 8s. 6d. per ton.
STEAM COAL, 10s., 9s. 6d., and 9s. per ton.
All free on board Vessels in Liverpool.
Handpicked Cannel and Coal about 10 per cent. additional. Concession in prices made for large quantities.
GAS APPARATUS of all descriptions, and on the most approved principles; also Purifying and other materials supplied.
ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references furnished on application.
CONTRACTS for Materials and Works entered into.
No charge made for Superintending Shipments, Preparing Bills of Lading, or passing Entries.

EMANUEL TURNER and CO.,
EXPORT OFFICES:
34, CASTLE STREET, LIVERPOOL.

GRAY, BAILEY, and BARTLEET,
BERKLEY STREET, BIRMINGHAM.
Manufacturers of Chandeliers and Gas Fittings, and Patent Steam Gauges.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,
&c. &c.
LONDON OFFICES:
76, KING WILLIAM STREET, CITY.
A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS,
WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the Iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,
GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.
Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.
During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.
RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

CHARLES BOTTEN and SON,
ENGINEERS & METER-MAKERS,
CRAWFORD PASSAGE, RAY STREET,
CLERKENWELL, LONDON (E. C.).
Manufacturers of Station and Patent Protector Consumers' Meters, Patent Slide-Valves, Gas-Fittings, Pipes, &c.
Also, High-pressure Cocks, Hydrants, Closets, and all Water-Fittings.

SAMUEL CUTLER, Gasholder
MAKER and CONTRACTOR
For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.
PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY,
and every Article suitable for
GAS AND WATER WORKS.

EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

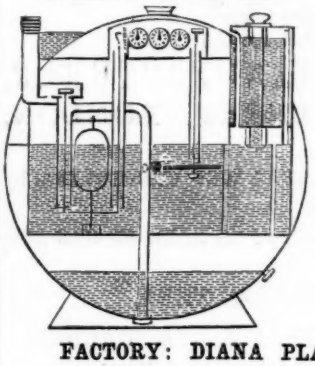
TO GASLIGHT COMPANIES, GAS ENGINEERS, AND SHIPPING AGENTS.
ON Sale, a quantity of Fire-Clay RETORTS, Circular, in sections of different lengths. 15, 16, and 18-in. interior diameter.
Apply to Z., Post Office, DUDLEY, which will have every attention paid to.

TO GAS & WATER COMPANIES, ENGINEERS AND FITTERS.
GARSIDE'S Registered Tube-Vice holds all sizes of Wrought-Iron and Brass Tubes with the greatest firmness and least possible pressure; consequently it is not so liable to split or damage the Tubes as the ordinary Vice, and considerably facilitates the Workman, who may do almost double the quantity of work. Also,
GARSIDE'S IMPROVED MAIN-DRILLING CLIPS, for Drilling Holes for Service-Pipes. With this instrument the perforation of Pipes for the attachment of smaller Tubes can be effected with great ease and precision. Likewise,
HEAP'S REGISTERED GAS TONGS, most highly approved of as vastly superior to those in present use.
Stocks, Taps, and Dies, together with all tools connected with Gas Engineering.
For Drawings, Testimonials, and prices, apply to the Maker, S. GARSIDE, Stamford St., ASHTON-UNDER-LYNE.

GAS Apparatus of every kind, and their action explained and thoroughly tested as to the practicability of HEATING BATHS, Conservatories, Halls, Public Buildings, &c., for all kinds of Cooking and Domestic Purposes, at PHILLIPS'S MANUFACTORY, 55, Skinner Street, SNOW HILL, E.C. (the Original Inventor and Patentee), Gas-Fitter by appointment to Her Majesty's Government and many of the Nobility.
N.B.—An assortment of Hughes's Patent Safety Atlas Chandeliers, and all kinds of Gas-fittings of a superior style and workmanship.

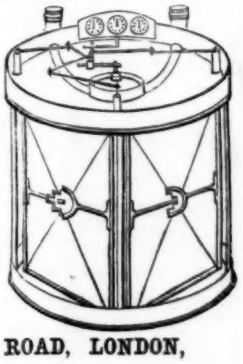
WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

PATENT WET METER.



N. DEFRIES,
CONSULTING GAS ENGINEER,
Inventor and Patentee
OF
WET GAS-METERS,
WITH SELF-ADJUSTING WATER-LINE;
DRY METERS,
GAS-HEATING BATHS, OVENS, STOVES,
GAS FIRES with INDESTRUCTIBLE FUEL,
&c., &c.

PATENT DRY METER.



FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,
Eight Doors from Factory.

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.
To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.
As to durability, his two large Meters at the Thames Tunnel have been in use night and day for upwards of twelve years—one continuation of dark hours—subjected to the wear and tear of seventy-five years as compared with the ordinary business hours of using Gas above ground.

LORD REDESDALE'S SALE OF GAS BILL.

All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

GEORGE ANDERSON, Gas and CONSULTING ENGINEER,
104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,
supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,
one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,
designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

GEORGE BOWER,
GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,
ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

JOSEPH WILLCOCK
(late BARLOW and CO.),
Mechanical and Architectural Draftsman, Designer, Serveyor, an Lithographer to Gas Engineers and Gas Apparatus Manufacturers, formerly Superintending Engineer at the largest Gas Apparatus Manufactory on the Continent.

Patent and Designs Office, 89, Chancery Lane, LONDON, W.C.

FIRE BRICKS.

THE MACHEN COLLIERY
COMPANY, NEWPORT (MON.).
Shippers of Fire-Goods of First-class quality manufactured from a remarkably pure seam of Fire-Clay.
Railway Communication by Broad or Narrow Gauge with all parts of the Kingdom, and by Seaboard, Coastwise, and Foreign.
LONDON AGENT:
Mr. JOHN ROBATHAM,
CLINK STREET, BANKSIDE, SOUTHWARK,
where a stock of the above is always kept.

PADDON AND FORD,
GAS-METER AND APPARATUS WORKS,
GRAY'S INN ROAD, LONDON.
MANUFACTURERS OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, EXPERIMENTAL APPARATUS, &c. &c.

Sole Manufacturers of Sanders's Patent Compensator for maintaining a correct Water-Level in the Meter without impeding its legitimate action.

All Meters manufactured by P. and F. are guaranteed to be in strict conformity with Lord Redesdale's Sale of Gas Act.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action. The Meters are warranted to offer less resistance than Meters generally.

Manufacturers also of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

Contractors for the erection or alteration of Gas-Works, and every description of apparatus required in Gas-Works supplied.

WEST and GREGSON, Gas-Meter
MANUFACTURERS, &c.
UNION STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

BENJAMIN GIBBONS, Jun.,
DEEPDALE FIRE-CLAY & BRICK WORKS,
Near DUDLEY,
Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,
TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.
References given, if required.

LIVESEY FIRE-CLAY WORKS,
NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,
7, SNOW HILL, AND 16, WEST STREET, LONDON.
ESTABLISHED 1836.

J. M. invites attention to his Improvements in **EXPERIMENTAL WET GAS-METERS,** by which he renders impossible any Leakage from the Stuffing-Box.

These **METERS** are **GUARANTEED** to meet all the Requirements of the **SALE OF GAS ACT.**

GOVERNORS, STATION-METERS, PHOTOMETERS,
EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,
AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**

JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

FLEXIBLE GAS TUBING,
VULCANIZED INDIARUBBER HOSE-PIPES,
WASHERS FOR STEAM-JOINTS, &c.

JAMES LYNE HANCOCK begs to inform the trade he has considerably improved the manufacture of his FLEXIBLE TUBING, both PLAIN and GLAZED. Made all sizes in 60 feet lengths.

INDIARUBBER GAS BAGS, fitted complete with Stop-Cocks and Tubes.

All orders to be addressed to JAMES LYNE HANCOCK, Vulcanized Indiarubber Works, Goswell Road, (opposite Spencer Street) LONDON (E.C.).

WILLIAM SUGG,

MANUFACTURER OF
PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,
"EVANS'S" PHOTOMETERS,
Experimental Meters, Minute Clocks, &c., Station Meters and Governors,
STREET-LAMP GOVERNORS AND LAVA BURNERS,
19 and 20, MARSHAM STREET, WESTMINSTER.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

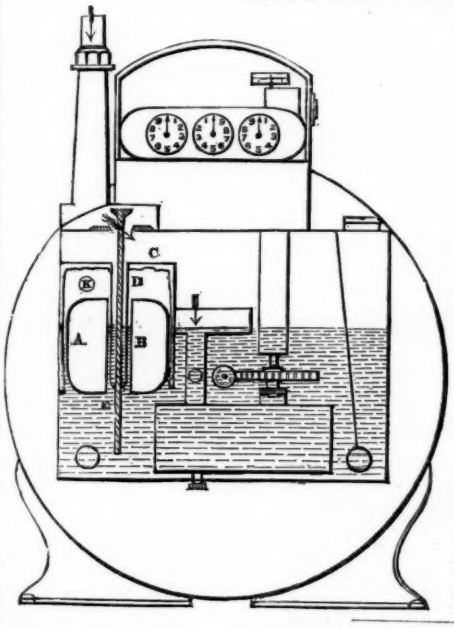
PATENTEES AND MANUFACTURERS OF

STATION-METERS & GOVERNORS,

CONSUMERS' METERS & GOVERNORS,

AND OTHER GAS APPARATUS. ALSO,

METERS FOR MEASURING WATER.



IMPROVED LOW-SPOUTED GAS-METER,

WITH

NEW PATENT FLOAT ARRANGEMENT.

The Float A is partitioned off from the front frame considerably below the water-line, and is pierced perpendicularly by a tube B.

A large gas-way, C, is left between the top of the partition and the valve-seat. The small tube D, in which the float-wire works, is fixed to the top of the partition, and comes down below the water-line inside the tube B. The float-wire is soldered to the float at E, so as to allow water to pass into the tube D, in order to seal it. The chamber above the float is open to the outlet through the hole K.

The action of this float is exactly opposite to that of ordinary meters. The float is elevated by sudden pressure, and the valve cannot be closed except through want of water.

W. P. and Co. beg especially to call the attention of Gas Companies and others to this New Patent Meter, which entirely overcomes the difficulty experienced by ordinary wet meters, owing to the short range of the float, which is necessary in order to meet the requirements of the "Sale of Gas Act."

They are prepared to supply

TEST GASHOLDERS,

of the most approved description, graduated by the Standard.

BOULTON'S PATENT DRY GAS-METERS,

Of which upwards of 24,000 are at present in use, having gained for themselves an unparalleled patronage from all the principal Gas Companies and Consumers, on account of their unerring registration and the superior workmanship and materials used in their construction, enables the Patentee to sell them now at competitive prices with those of other makers.

Every description of Improved Wet or Patent Dry Meters and Gas Apparatus manufactured by

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL.

All Meters warranted to comply with the requirements of Lord Redesdale's "Sale of Gas Act."

BENT AND SON,

283, BELL-BARN ROAD, BIRMINGHAM,

(ESTABLISHED 1830,)

Manufacturers of

J. C. BENT'S PATENT COMPENSATING GAS-METER;

Also of

ALLAN'S PATENT COMPENSATOR,

Both of which are warranted to meet the requirements of the SALE OF GAS ACT.

Station-Meters. Street Lamps of all kinds, plain and ornamental.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

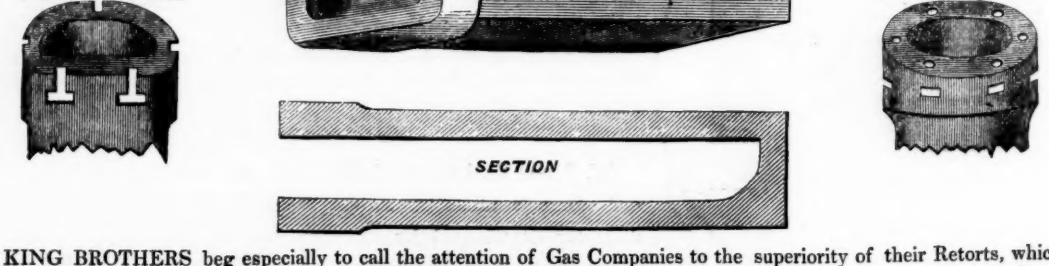
Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS,



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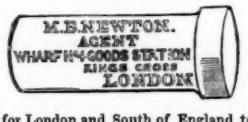

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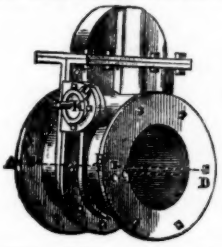

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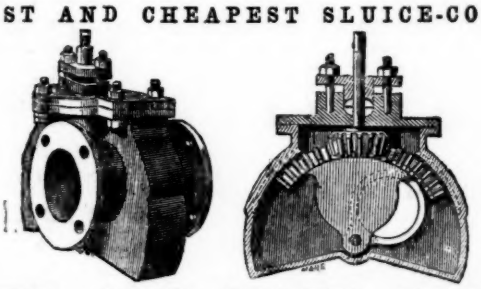

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